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SELECTED READINGS ON INTERNATIONAL COOPERATION IN ENERGY RESEARCH AND DEVELOPMENT

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SCIENTIFIC PLANNING AND ANALYSIS

AND THE

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DEVELOPMENT AND DEMONSTRATION

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LETTERS OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D. C., June 14, 1976.

Hon. OLIN E. TEAGUE,
Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: We are transmitting herewith a compilation of selected articles and documents on the newly developing subject of "International Cooperation in Energy Research and Development."

It is our hope that these materials will serve the Members as a background reader for our forthcoming joint hearings on this timely topic.

This compendium was prepared by Dr. Martha Krebs-Leidecker, analyst in the Science Policy Research Division of the Library of Congress.

We commend it to you and to the Members of the Committee on Science and Technology.

RAY THORNTON,
Chairman, Subcommittee on Domestic and International Scientific Planning and Analysis.

MIKE MCCORMACK,
Chairman, Subcommittee on Energy Research, Development and Demonstration.

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INTRODUCTION

Before the oil embargo of 1973, only a few unheeded prophets were mindful of energy as a social and political issue and one with international implications. The embargo radically changed the status quo; oil shortages and soaring prices produced a world-wide reaction against dependence on imported oil. However, aside from nuclear energy, very few organizations had evolved to coordinate cooperative research and development in energy technologies.

The existing international agencies, UNESCO, NATO, and OECD moved quickly to incorporate and support work in energy R. & D. The premier statement of intent is the International Energy Agreement (Appendix II) which is the foundation document of the International Energy Agency.

The United States, in addition to signing the Agreement, also made specific provision for facilitating international energy R. & D. The Assistant Administrator for International Affairs in the Energy Research and Development Administration, is designated to assist in incorporating R. & D. goals into international energy policy, to participate in the negotiation of bilateral and multilateral research agreements, and to oversee the work done by the various international groups.

The area of broad-range international energy R. & D. is relatively new, and for a large part, unexplored territory. The sources and documentation available in this field had been diverse and not well focused. They often concerned or described the more general, international scientific cooperative aspects. This lack of specificity also had been evident in papers on energy. These readings are a brief overview of policy statements, R. & D. strategies, descriptions of work to be done, and work that is being conducted in this area.

(From "Energy R&D Policies in OECD Member Countries", Energy R&D, OECD, Paris, 1975)

I TOWARDS AN OVERALL STRATEGY

A. PROGRAMMES AND FINANCING

The direct consequence of the oil crisis has been an additional burden to the economy of oil importing countries which has in some cases further aggravated an existing balance-of-payments deficit. National economies are now facing, in addition, another indirect consequence of the crisis, i.e. the increase of energy R & D activities in an attempt to reach self sufficiency or at least to ease their dependence in energy supplies.

This is the first general trend which emerges from the observation of national programmes and budgets on energy R & D. In fact, not only have additional amounts been devoted to the development of the potential of conventional sources such as coal and oil through new technologies - coal gasification and liquefaction - or to the exploration of additional reserves, such as off-shore oil, but nuclear research has increased considerably, whilst an entirely new set of other sources have gained new financial support. Energy promises thus to be for the next decade and at least until alternative sources for oil are developed, one of the major objectives in R & D expenditures, both public and private which will call for a change in R & D priorities.

Obviously resources allocated to energy R & D should primarily be established on the basis of the energy objectives set by each individual country, hence of their energy policy. However, other factors related to science policy, as well as to economic, industrial and environmental policies, will also play a key role in determining the overall level of national energy R & D budgets.

Whatever the weight given to different factors to set a desirable level of R & D, what is essential is to ensure that the present sudden increase in energy R & D be not followed in the next few years by an equally sudden curtailment of expenditures.

The discontinuity of the research effort is more likely to occur in this field as the present and planned programmes are partly the result of the crisis. It is possible that once the more spectacular effects of the crisis disappear, programmes may be slowed down and reduced considerably even if the crisis continues to be

real for many years. The risk of such a "stop and go" policy would then be an ill balanced research policy sacrificing long-term objectives to short-term needs.

1. The imperatives of a balanced R & D

R & D will play a key role in solving the energy problem but is not an isolated element of the energy issue. It is essential then that its programmes and budgets be well balanced so as to take into account the various components on which it will have repercussions. In quantitative terms this means that the distribution of resources should be directed towards keeping as wide a number of energy options as possible. In qualitative terms, the purpose of this balance is to avoid the development of a massive technology without creating the proper human and environmental conditions for its acceptance. If properly balanced, then R & D can help to avoid distortions and bottlenecks at different levels.

At the policy level, research aimed at energy production should no longer be limited to one primary source. Efforts should be made to develop alternative primary sources with a view to a fuel diversification policy. Such diversification can in the best case bring about complete independence as to supplies and in any case, reduce dependence from a single supplier and from a unique form of energy.

Equally at the policy level, the finite nature of certain primary sources of energy and the inability of countries to meet the needs of an exponential growth at past rates and under acceptable economic and environmental conditions, requires that research should aim not only at satisfying the energy demand but also at curbing it. There has been up to now no long-term view of the impact on the economy of energy conservation. This being a concept directly generated by the crisis, R & D plans in this field may be limited to short-term innovations and improvements to fight the crisis. Efforts should be made so that R & D on energy conservation be conceived in the future as part of a continuous long-term plan.

At the level of the energy cycle, a coherent energy development requires that a proportionate share of research be undertaken at the different stages of the energy cycle (production, conversion, storage and transmission) if bottlenecks of a technical nature are to be avoided.

At the level of energy systems. For the integration of energy in a comprehensive energy system, hardware development must be coupled to software research. Software research is needed not only on the technology side, i.e. to identify through system analysis the impact, cost and benefits of different technologies at the economic and environmental level, but also on the social side to examine the relation between energy and society and the problems related to this issue.

2. Overall review of energy R & D

The programmes and expenditures devoted by Member countries to energy R & D presented in this section, as well as in Annex I, are mainly drawn from information submitted before May 1974. For this reason and even taking into account the amendments transmitted later on, they do not in many cases represent the definitive plans of Member countries concerning energy R & D and may already have changed by the time this report is published.

Owing to marked differences in the energy situation of Member countries as regards both their natural resources and their R & D level, there is no ideal classification which would allow of meaningful generalisations and conclusions as to the content of energy R & D. However, for the purpose of this review, the OECD countries have been grouped according to the availability of natural resources, this being in most of them a major determining factor for the formulation of R & D programmes:

i) countries with large and diversified energy resources: Australia, Canada, Norway, United Kingdom, United States;

ii) countries with one predominant and relatively abundant energy resource: Iceland, Netherlands, New Zealand;

iii) other countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Portugal, Spain, Sweden, Switzerland, Turkey, Yugoslavia.

a) Energy production: Choice and diversification of energy primary sources

Obviously the problem of choice and diversification of primary sources of energy is quite different for countries having considerable and varied natural resources and for those who have not, although the availability of resources has not necessarily been in the past a condition for a strategy of diversification. Indeed, very few countries have natural resources coupled with large national resources in terms of GNP and an adequate supply of manpower to be able to support research in the whole range of primary sources. The combination of these three elements may be found with different degrees of importance in three countries belonging to Group I, the United States, Canada and the United Kingdom.

Of the countries in Group I, and of all the countries covered, only the United States supports a systematic research effort on all energy sources. It is true that such diversification is possible because of the availability of natural resources and a high R & D expenditure capacity, but this represents nevertheless a new policy trend in a country - not the only one however - which has in the past disregarded the development of national energy resources in favour of increasing oil imports.

The total proposed federal expenditure on energy R & D for 1974 in the United States amounts to $1,000 million, of which 63 per cent for nuclear energy, 16 per cent for coal, 4 per cent for new energy sources, 2 per cent for hydrocarbons and the remaining 15 per cent for energy carriers, utilisation, systems and the environment. The energy R & D budget shows an increase of 49 per cent over 1973. However, the increase is comparatively much higher (400 per cent) for the development of new energy sources - mainly solar and geothermal energy - than for coal (100 per cent) or nuclear energy (35 per cent). Government support is slightly increasing for hydrocarbons, R & D in this field being predominantly financed by private firms. It should be noted that United States R & D expenditures on coal and new energy sources are equivalent to, if not higher than, the research effort made by all OECD countries together in these two fields.

The United States is also one of the few countries which is developing energy sources according to a long-term plan. The proposed "Project Independence" plans R & D for 5 years beginning in Fiscal Year 1975 and for that year the proposed increase in total energy R & D is 81 per cent over 1974.

Canada, with a smaller R & D potential, is engaged at present in three important research programmes. The first and most significant one in size (approximately 70 per cent of the entire R & D budget) relates to the development of an independent nuclear technology with the CANDU reactor. The second covers off-shore oil production systems and the third relates to tar sands production methods. Federal support for tar sands extraction is rather small (1 per cent of the total energy budget) but the provincial government of Alberta supports R & D on in-situ production of deep tar sands at the rate of 100 million Canadian dollars for a period of 5 years.

Canada also supports, in addition to a small programme on coal, a programme on new energy sources (5 per cent of the total energy R & D) covering the whole range of non-conventional sources other than nuclear. In absolute figures, the Canadian effort in this field is the highest one after the United States and Japan. With such a comprehensive programme and its large resources in uranium, oil, gas and tar sands (the largest deposits in the world), Canada is one of the few countries heading for self sufficiency.

The United Kingdom may be included in Group I countries particularly in view of the large reserves of oil and gas recently discovered in the North Sea which add to the substantial coal resources available. Expenditure on coal research is presently under review. In recent years nuclear research in the United Kingdom has concentrated on the fast reactor. With the recent decision on choice of

thermal reactor for the United Kingdom programmes a changing pattern of expenditure is expected.

Australia, with relatively large resources in uranium, coal and oil makes a substantial effort particularly for coal In percentage of its total energy R & D this represents 27 per cent, a higher rate than Germany (26 per cent) or the United States (16 per cent), but in absolute figures the research effort on coal made by Australia is not comparable to that of those two countries. The largest expenditures (70 per cent) relate to nuclear energy and bear mainly on the development of some aspects of nuclear technology. A very modest effort, less than 2 per cent, is also made on new sources, namely on solar energy.

Last in this Group in respect of the extent of research programme undertaken, Norway makes nevertheless a considerable effort in the exploration of oil and gas following the important discoveries of the North Sea. R & D in the field of hydrocarbons is almost of the same magnitude as for nuclear energy ($4 million against $5.0 million for nuclear energy). Norway takes second place among Scandinavian countries after Sweden, for nuclear expenditures and can only support a modest share of an international programme. The extent of the resources in the North Sea cannot yet be accurately predicted but it is expected that Norway will be in a position to export large quantities of oil.

Countries included in Group II, having one predominant and relatively abundant resource, are engaged mainly in the development of that energy source. Research on alternative sources bears mainly on nuclear energy but the medium or small R & D potential of these countries does not allow the development of major independent programmes.

The Netherlands, with its large gas resources carries out an important privately funded programme in the field of hydrocarbons. The R & D programme for nuclear energy is in absolute figures the most extensive one of the countries in this Group. Programmes on other non-conventional sources have been announced but the related expenditures are not known. A national programme on energy research is being prepared.

Among the countries which are included in Group II, Iceland, has the smallest R & D potential and supply of scientific manpower as compared to other OECD countries. Last in this Group for the size of the research effort, this country concentrates all of its R & D potential on the exploitation of hydropower and geothermal energy. A total of $1.6 million is devoted to R & D in these two sources, but geothermal research has been increasing faster in recent years. Iceland is the only country not involved in any R & D programme in nuclear energy.

The third Group of countries with limited resources includes countries whose expenditures for the whole range of R & D activities and whose level of scientific manpower are either large: France, Germany, Japan; medium: Belgium, Sweden, Switzerland; or small: Austria, Denmark, Finland, Greece, Ireland, Luxembourg and Turkey.

France supports a large independent programme in the nuclear field and devotes considerable R & D funds to hydrocarbons ($81 million for 1973). Taking into account the fact that France has very limited hydrocarbon resources, such an effort is the result of a deliberate governmental policy at the national as well as at the international level. Expenditures for research on other sources such as solar and geothermal energy amount to 1 per cent of the total energy R & D budget in 1974.

Germany is one of the countries whose level of expenditures for energy R & D is very high, particularly taking into account that R & D expenditures mentioned in this report do not include industry supported research programmes. In 1974, Germany allocated 67 per cent of its total energy R & D budget to nuclear energy, which allows for the development of a largely independent programme, and 26 per cent to coal whose reserves are the largest ones after the United States in the OECD zone. In addition, a long-term 4-year programme is planned in almost all energy sectors and it is foreseen that research in nuclear energy and coal will increase by 50 per cent by 1976 and more than four times so far as new technologies for the exploitation of natural gas and oil resources are concerned.

Japan, an R & D intensive country with large supplies of manpower, makes a special diversification effort. Its independent programme on nuclear research is growing gradually and represented in 1974 about 85 per cent of the total budget. The attention given to coal development is increasing at an equal scale. In addition, through its Sunshine project a special effort is being planned on other non-conventional energy sources. Although no definite figures are available, the proposed research effort on solar and geothermal energy and waste processing may amount to about 8 per cent of the total energy R & D budget.

For Greece, the recent and potentially most important discovery of oil and gas in the Aegean Sea might constitute the major energy supply, although there is no indication as yet to the total amount of the deposits.

For the time being, R & D in Greece relates mainly to exploration of energy sources such as lignite, peat and geothermal energy besides oil and gas. The Greek Public Power Corporation alone will devote $6.5 million a year to R & D on energy with main emphasis on development, design and testing.

With the exception of Ireland which devoted in 1974 only 2 per cent of its energy budget to nuclear energy (90 per cent being

allocated to research on peat) and of Luxembourg which makes no research effort in this field, most of the other countries in this Group devote a very high share of their budget to nuclear energy: Belgium, 44 per cent; Switzerland, 55 per cent; Sweden, 75 per cent; Denmark, 78 per cent; Finland, 86 per cent. Sweden is however the only country where the predominant nuclear research is linked to an advanced nuclear technology and a powerful national nuclear industry. The other countries carry out nuclear research either as part of a multinational effort (Switzerland, Belgium) or develop only some aspects of nuclear technology (Denmark, Finland).

Austria and Turkey have not provided sufficiently adequate figures to allow of meaningful comparison of the funds devoted to different energy primary sources.

b) Production versus conservation

Most countries appear to be aware of the need of including conservation programmes in the formulation of an energy policy on ethical and rational grounds. Research in this field still appears to be very limited as compared to energy production but it must be stressed that expenditures in this field are difficult to assess. R & D financed under the heading of other energy sectors falling outside the strict definition of "utilisation" (energy conversion for instance) relates in many cases to conservation and serves this purpose.

In absolute figures substantial programmes of R & D undertaken under the heading of conservation and aiming at better utilisation of energy have been planned in France, Germany and the United States. In the United Kingdom, the nationalised fuel and power industries especially have substantial programmes aiming at better utilisation of primary fuels. In percentage of the reported expenditures on energy R & D, France and the United Kingdom devote 7 per cent, Germany 5 per cent and the United States 4 per cent in 1974.

The highest percentages of expenditures are those of Denmark and Finland (14 per cent and 8 per cent) but given the size of their energy budgets, which total less than $5 million, they are not comparable to the lower percentage spent on conservation by the United States. It is questionable however, whether the relation production - conservation is the only criterion for determining the appropriate share of conservation R & D in an energy budget. It is true that for a resourceless country energy economies are in any case desirable, but consideration should also be given to the consumption rate and to the impact of such economies on consumption which is already low.

Although all necessary research in the economic interest of the industries will be undertaken, it remains to be seen whether the initial concern shown by countries regarding conservation will

continue to grow or whether the programmes planned at present will slow down as the crisis gradually ceases to attract public attention.

c) The importance of energy carriers

Energy carriers are related to three different aspects of energy R & D. First, there is a direct relationship with energy production insofar as energy carriers ultimately allow its appropriate, efficient and environmentally acceptable conversion, storage and transmission. Second, a type of energy carrier is often related to a particular energy source. Third, for a given energy carrier, there is an inter-relationship between its three functions, i.e. the conversion, storage and transmission of energy.

As regards the relation energy production - energy carriers, the adequacy of research planned on energy carriers compared to energy production is indeed difficult to establish. The effort devoted by different countries is quite uneven and the highest figures - as a percentage of total energy R & D - are those of Sweden (20 per cent), France (11 per cent which includes R & D of nationalised industries), the United Kingdom (9 per cent also including work in the nationalised industries) and Switzerland (approximately 8 per cent). The United States devoted approximately 2 per cent in 1973 and 2 per cent in 1974 which, given the rise in the total R & D budgets from 1973 to 1974, means an increase of 120 per cent against 47 per cent for energy production.

The adequate level of R & D for energy carriers cannot however be set arbitrarily at a given percentage and a meangingful evaluation of R & D expenditures requires a country by country study which takes into account multiple factors such as the development stage of research, the prevailing primary source of energy, geographical conditions, population and industrial distribution.

Furthermore, in observing national programmes and level of funding allocated to different energy carriers, there appears to be no major research on a secondary source system besides electricity, although some programmes on hydrogen and methanol have been announced, and a small effort on district heating is being made by a few countries. For the time being, electricity is more directly linked to the development of nuclear energy but in the long-term other carriers will have to be developed to replace a transportable and flexible fuel like oil and to avoid the considerable heat losses of electricity generation and transmission.

Finally, some imbalance appears in R & D programmes and funding with respect to electricity. Storage seems to receive a relatively low funding as compared to generation and transmission. Although given the stage of research, such funds may prove to be adequate, it must be taken into account that if electricity is to become the

major energy carrier, it remains a very difficult form of energy to store for which extensive research is necessary.

d) Energy systems

One of the difficulties confronting governments today in making decisions is the lack of comparative and comprehensive studies providing valid criteria and the basis of a choice as well as the inadequacy of conceptual instruments for assuring that such choice satisfies social and human needs. Major research programmes on energy systems, covering the technical, economic and social components of the energy issue are at present still the prerogative of few countries, namely the United States and at a much lower level of funding, the United Kingdom. These countries devote 1.7 per cent and approximately 1 per cent respectively of their energy R & D budget for 1974. Other countries have announced research programmes on energy systems, namely Denmark, Germany and the Netherlands, but no figures are available.

Such studies are essential for countries having diversified resources and therefore difficult choices to make but they are even more important for countries with scarce resources and average or small R & D potential, as the wrong choices may in such cases be more prejudicial.

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From the review of the R & D programmes and funding undertaken by different countries and summarised in the preceding sections, some specific trends emerge. Of all the energy sources, nuclear energy constitutes the main R & D objective in most countries. The proportion devoted to it, which in the case of a few countries is slightly lower than 50 per cent, ranges in all the others from 60 per cent to 85 per cent of the total energy R & D budget. Its competitiveness and technological feasibility - at least for fission reaction - and the long-term supply it will provide with the development of fast breeders make nuclear energy the predominant choice despite the controversial environmental problems it raises.

At the other end of the research scale, programmes on new sources, mainly solar and geothermal energy, although very limited in extent and of real concern to a few countries only, are a first sign of a more comprehensive and long-term approach. The percentage devoted to these sources ranges between 1 per cent and 8 per cent except for Iceland where geothermal energy accounts for more than 50 per cent. In absolute figures only Canada and Japan devote an approximate amount of $5 million whilst expenditures in the United States total more than $36 million for 1974.

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The only figures available for 2 consecutive years, those of the United States, show almost a fourfold increase but this remains quite an exceptional increase rate limited to one country. Progress will be slow until this field, still mainly supported by governments, attracts industrial interest for research and investment. What seems important, however, is that the research effort on these sources is planned for a number of years (the United States and Japan). The increase planned in the years to come might therefore well bring the research level to the point where their development could no longer be stopped, or at least would no longer be of marginal interest.

Fossil fuels appear in an intermediate position and research expenditures on coal, for instance, are significant only in a few countries; the United States, Germany and at a much lower level,(1) the United Kingdom and France. In these four countries coal R & D for 1974 amounts to approximately $380 million and their percentage is between 15 per cent and 26 per cent of the energy budget of these countries. More difficult to assess is the present research effort on hydrocarbons in the absence of industry R & D figures. Certainly the impact of a dynamic and powerful private industry supporting this field might well speed up the necessary technology for new discoveries and better exploitation of resources.

Although some choices may be considered as a result of decisions taken in a time of crisis and therefore liable to change, the present R & D commitments already indicate the main lines of energy developments for several years to come.

3. The impact of energy R & D on other policies

The extent of the investments for research and a sound energy R & D policy are but one condition for a successful solution of the energy problem within an overall energy policy. Governments will have to make simultaneous efforts on several fronts and undertake research also in connection with energy related policies such as overall policies for science and technology.

Because of the high interdisciplinarity and the complexity of the energy field, progress in energy R & D will in fact depend upon advance of fundamental research in a number of disciplines and in materials science as well as upon the provision of the necessary qualified manpower required to master the resulting technology.

Among the disciplines which should receive increased support, earth sciences - namely geology, geochemistry and geophysics - are of primary importance because of their relevance to the exploration, assessment and exploitation of most energy resources. Research on chemical engineering and particularly on organic and hydrogen

1) Not taking into account industry R & D expenditures.

chemistry and electro-chemistry should also receive adequate attention. A special effort is also required for the development of materials science and technology. Apart from catalysts upon which further progress in chemical engineering depend, research is also needed to improve the economics, the life-time as well as the heat, corrosion and radiation-resistance of materials.

As regards scientific and technical manpower, whilst the sophistication of energy related technologies will require a substantial increase in the supply of engineers, the provision of a great number of technicians will be an equally important condition for the implementation of R & D. A rough estimate for the United States alone indicates that the projected energy programmes require an increase of qualified manpower of as much as 40 per cent by 1980,(1) which means that it will have to be supplied at a rate seven times higher than for the past 12 years.

In a broader social context research on conservation and energy system assumes improvement and progress in social sciences. As it has already been mentioned in this report, the role of social sciences will be to contribute toward the knowledge and understanding of the social obstacles to the public acceptance of certain sources and forms of energy such as nuclear energy or other new energy sources. Social science research is even more essential in the field of energy utilisation. In fact, beyond the energy savings which may be expected from improved production and utilisation technologies, all problems of energy resource conservation are closely linked to the life-style and the industrial and economic structures of society.

Finally, R & D for large scale energy production and utilisation will have to be coupled to research on environmental sciences. Present understanding of the general environmental effects related to large scale production and utilisation of energy is quite insufficient. This is also particularly true for the influence of thermal emissions in the atmosphere. Although the science of climatology is in its infancy and even if it is not known with certainty whether or not a considerable energy increase would have adverse effects on climate at world level, the possible effects on local climates of an important heat flux exceeding solar radiations constitute a serious problem which deserves research and attention.(2)

Moreover, the development and utilisation of all energy resources depend vitally on water and land resources and will give rise to very serious problems of location, installation and land use. The broader issue of the relation of energy to the environment is dealt with in a separate report prepared by the OECD Environment Committee.

1) U.S. Energy Prospects, An Engineering Viewpoint, National Academy of Engineering, Washington D.C., 1974.

2) In the centre of New York for instance, the heat flux is equal to 630 w/m^2 i.e. 9 times the solar heat reflected by the continent.

B. INSTITUTIONAL PROBLEMS

Leading or following the new trend towards a comprehensive energy R & D policy, governments now emphasize the need to create national energy R & D administrations which will be in charge of all scientific and technological aspects of energy. Their task will be to place the numerous disparate energy R & D centres into national, if not international, perspective and to allocate resources to them in accordance with the needs and priorities of the overall policy.

This decision does not always imply the creation of a new agency. In some countries, traditions of decentralisation and the relative inertia of the research system do not lend themselves to a quick reassignment or concentration of R & D responsibilities in new agencies. Some countries, such as Denmark, France, the Netherlands, Sweden and Switzerland, have formed ad hoc co-ordination committees or advisory councils for energy R & D which do not permanently change traditional administrative structures.

In several countries, nuclear energy agencies - to mention the most noticeable example - still have difficulties in finding their place in this new framework. After many years of generous government support and relative independence, nuclear energy agencies do not easily accept being "absorbed" by a broader energy R & D organisation. On the contrary, they occasionally endeavour to become the government organisation responsible for the entire public energy R & D effort themselves.

The creation of a comprehensive energy R & D administration or of a R & D co-ordination committee with similar competences, raises questions about the links between this new body and existing administrations. In principle, the links which can be envisaged for the new body are threefold:

1. with the overall energy policy organisation
2. with the overall science policy organisation
3. with the energy R & D laboratories in industry, university and government.

There is no unique, and probably no ideal solution to the problems of integration between energy R & D administrations, energy policy and science organisations, and energy R & D laboratories. All three links are equally necessary, but depending upon specific needs and traditions, some countries put more emphasis on one type of link than on others.

Energy R & D administrations and energy policy

More or less effective energy policies existed in some, but not in all countries. Already before 1973, ministries in several

countries had included specific responsibility for energy policy among their attributes, for example Canada, Ireland, and Turkey. However, in most countries, energy policy was one of the numerous responsibilities of economic, finance or industry ministries.

The energy crisis has so far led to the creation of new ministries and agencies, or other high level institutions, responsible for energy in at least two countries; the Department of Energy in the United Kingdom(1), and the Federal Energy Agency in the United States. Other countries have set up new energy authorities or departments in existing ministries. Some of these countries, e.g. Canada and the United Kingdom, favour the links between energy R & D administrations and general energy policies. Thus, in the United Kingdom, the new Department of Energy has a general co-ordinating role for all R & D linked to energy policy.

Energy R & D administrations and science policy

Other countries seem to lay more emphasis on the links between energy R & D and science policy. They have charged science ministries or corresponding science policy bodies with the administration of energy R & D. This is more than a continuation or reinforcement of the traditional roles of science policy bodies. Science policies of the past usually did not look at "energy" as a whole, but as specific, unrelated, energy sectors. The new task is more global. In Germany, for example, energy R & D programmes are being planned and co-ordinated by the Ministry of Research and Technology, although they are an organic part of the overall energy policy. In Belgium the science policy authorities are responsible for the overall co-ordination of energy R & D.

Energy R & D administrations and energy R & D laboratories

Linking an agency or committee with overall responsibility for energy R & D to the laboratories responsible for executing it is perhaps the most difficult of all three co-ordination tasks.

The autonomy of old, sometimes powerful and mostly resistent research laboratories usually makes close co-ordination with a new administrative body difficult. One way to solve this problem might be to group the administrative responsibility for energy R & D, and the government laboratories carrying out this R & D, into a new, independent institution. Energy research policy and its implementation would come under the same roof.

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1) The United Kingdom has previously had Ministries dealing specifically with fuel and power; only over recent years had their function been combined with other departments.

The United States envisage trying this solution, apparently the only country to do so for the time being. An Energy Research and Development Agency (ERDA) has been proposed which will be responsible to the President directly, and not to the Federal Energy Agency, nor to the National Science Foundation. However, ERDA will have to seek some form of co-ordination with both science policy and energy policy agencies in spite of its legal independence from other administrations. In the same way, the two other forms of co-ordination - be it administrative integration of energy R & D policy into an energy ministry or into a science ministry - will ultimately succeed only if there are some links with the other ministry as well.

A clear-cut, exclusive assignment of all energy R & D responsibilities to one ministry or administration might facilitate the formulation of national priorities and the carrying out of certain national policies, but it will not guarantee success if the other parts of the administration and of the research system do not co-operate.

The reorganisation of energy R & D centres and responsibilities in the government sector is an indispensable, but not necessarily sufficient condition for the technological solution of future energy problems. Industry is becoming increasingly important in this context, not just as one of the sectors performing energy R & D, but as an active partner in national energy policies. This is largely due to the diversification trend which distinguishes some leading oil companies. Traditionally, they have limited themselves to the production and marketing of oil and oil products, but some of them are now increasingly becoming energy companies in the widest sense. Massive acquisitions of coal and uranium mines and noteworthy R & D efforts in the oil, nuclear, coal, shale, geothermal sectors, have placed a part of the big oil industry in a position of influence and responsibility with regard to all national energy R & D policies. Thus, the industry will have to participate in the formulation and carrying out of national energy R & D policies, if governments want such policies to be fully successful.

III OPPORTUNITIES FOR INTERNATIONAL CO-OPERATION

The serious limitations, and in some cases failures, of international co-operation in R & D which have occurred in the past in some specific sectors, force recognition of the fact that international co-operation will succeed on condition that it is inspired by a common political will and policy of the partners involved and not only by the internal logics of science and technology or that of the institutions created for the purpose. Besides, not all forms of co-operation have proved to be equally efficient, and in this regard bilateral and trilateral agreements have met with less difficulties than broader international co-operation schemes.

However, before examining the problem of international scientific and technological relations in the particular case of energy, it may be useful to review briefly the advantages that could be gained in general by international co-operation in R & D:

- it makes greater resources available, in terms of the information, knowledge and know-how necessary for any R & D activity;
- it means that the whole process, from the research stage right up to the practical application of the results, may be speeded up;
- it can reduce the overall cost of R & D programmes through more efficient utilisation of financial resources, equipment and skilled personnel;
- it makes possible a wider range of approaches.

There are also the following specific factors which render scientific and technological co-operation not merely desirable but essential in the field of energy:

- the importance of what is at stake: the economic and social structure of OECD countries is dependent upon the intensive use of energy; this situation cannot suddenly be altered without grave consequences for national and international equilibrium.
- the international dimension of all aspects of energy.(1)

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1) cf. Part I

- the vital importance of research: during the sixties, oil dominated the scene because of the exceptional combination of advantages it offered; being cheap, plentiful, and easy to transport, store and use. Now that some of these advantages have disappeared, the need to find other, substitute sources, makes it essential to undertake systematic, large-scale research and development covering the totality of the energy field.
- the extent of the energy sector is such that no single country can carry out an R & D programme on this scale.
- the increasing complexity of the field: in the past the only determinant factors were technical and economic, but now the importance of social and environmental aspects must be taken seriously into account.

As in other areas, the development of international co-operation in energy R & D is largely dependent on development of the national R & D effort, of which it is merely an extension. Conversely, in the formulation of national R & D policies covering the whole field, possible ways and means of co-operating with other countries, and the requirements of such co-operation, should be systematically surveyed. Thus, before identifying principal areas for research that should be given priority in any joint action by OECD countries, a review of existing co-operative activities in the various sectors of the energy field would seem to be necessary in order to identify the areas where increased co-operation appears desirable and feasible. Consideration of activities in co-operation should clearly not be confined to the scientific and technological relations between the OECD countries. It should extend to co-operation between developed and developing countries; in particular, the latter should be associated to co-operative programmes at their very beginning. However, since this question arises in a different context, it is dealt with in a different chapter of this report.

A. THE PRESENT SITUATION IN THE DIFFERENT ENERGY SECTORS

International relations in the energy field are already well-established, as evidenced by the number of bilateral agreements and international organisations to which reference has already been made, to say nothing of the informal contacts between scientists and laboratories and the agreements between industrial firms. Nevertheless, these international links may be misleading: in many cases all that is involved is the exchange of general information, rather than a true co-ordination of research projects, or research carried out in common. In particular, the existing pattern of international relations

is very uneven in coverage and highly dispersed. It may be noted here that the weaknesses of international co-operation very largely reflect those of national policies.

Little information is available on research carried out by industry and this report therefore deals mainly with sectors in which governments play the predominant role; generally speaking, these cover medium and long-term research or research bearing on environmental and safety aspects. In the case of industrial research, the initiative regarding co-operation is usually left with the firms themselves and the role of government is primarily to provide information about the possible areas for such co-operation and to remove any legal or procedural obstacles. However, this does not mean that governments could not assume a more positive role in promoting co-operation in relatively short-term research; one possibility which would appear to deserve careful consideration would be for several countries to join together in the financing of demonstration plants.

1. Fossil fuels

Co-operation in this sector especially as regards oil and natural gas, is relatively limited, or at least little is known about it, the industries concerned being mainly in private hands. As far as exploration and resource evaluation are concerned, there is a measure of world-level co-operation in theoretical questions within the International Union of Geological Science. At the more practical level, the heads of the geological research organisations in the different European countries meet once a year to discuss problems of common interest. Co-operation between Member governments on this question should be far more intensive and systematic in view of its importance in the formulation of energy policies.

The oil and natural gas production sector could be a suitable area of co-operation, but the fact that it is mainly in the hands of private industry may limit opportunities for governmental co-operative actions. On the other hand it may to some extent be regarded as international in view of the predominant role of the multinational oil companies. However, not much is known about the relations between these companies and their national subsidiaries, or about co-operation between the various multinational companies. One example of this type of co-operation is SEAL (Sub-sea Equipment Association Limited), an engineering firm set up by CFP, BP, Mobil, Westinghouse and DEEP (a group which includes the Institut français du pétrole) and specialising in offshore oil.

Although private industry largely dominates this area, governments could still fulfil an important function in developing co-operation in certain technologies, such as offshore oil research, the underground or sea-bed storage of hydrocarbons and the transport

of gas by sea. In a more general way, they could encourage the gas distribution companies, which are public utilities (and, in many countries, nationalised undertakings) to do more about co-operation. Organisations already existing include the European Gas Research Group, of which the gas undertakings of six of the Common Market countries are members, and the Gas Atlantic Research Exchange formed by Gaz de France, the British Gas Corporation and the American Gas Council.

More information is available about international relations in the coal sector, where governments have greater responsibility. The West European Coal Producers' Association (CEPCEO) and more especially the European Coal and Steel Community (ECSC) continue to provide an institutional framework for co-operation of a most extensive nature. Co-operation regarding safety in coal mines also has a long history: international conferences on this subject have been held every two years since 1931, the most recent meeting having taken place in 1973. In addition, the heads of R & D departments concerned with safety questions in Belgium, France, Germany and the United Kingdom meet annually to discuss and co-ordinate their plans. Representatives of the United States Bureau of Mines have attended on the last two occasions.

A major event as regards R & D aimed at improving coal combustion and conversion processes has been the conclusion of bilateral co-operative agreements between Germany and the United States, and between the United Kingdom and the United States. The ECSC has put forward plans for future co-operation in these areas.

Thus there is already a substantial measure of co-operation in the coal sector, but even so, in view of the renewed importance which coal seems likely to assume, and the research programmes now under way in many countries, co-operation needs to be systematically extended and intensified, with particular reference to mining, utilisation and conversion techniques. Here governments must be the prime movers since they play a key role in the sector at national level, but industry must be fully involved in any plans for co-operation.

For resources such as oil shale, tar sands and peat whose importance is confined to a small number of countries, the countries concerned might well find it worthwhile to consider co-operation in the form of bilateral or trilateral agreements.

2. Nuclear Energy

From the outset, nuclear energy has been the subject of particularly intensive international relations. Although, there are in this sector, more than in any other, very many bilateral agreements

and international organisations (IAEA, NEA and EURATOM), there is no disguising the intense rivalry that exists between countries, and the fact that co-operation could be appreciably improved in many respects.

Reference was made above(1) to the trend toward increased internationalisation in industry. This is a logical feature of development in the nuclear sector and, far from obstructing it for reasons of short-term national interest, Member governments should give it every encouragement.

Other important aspects of nuclear energy calling for greater co-operation between governments are all those questions relating to the environment, safety and radioactive wastes. Radiation protection, for example, is probably the field where the record of co-operation has been most outstanding, as a result of the work of the International Commission for Radiological Protection whose function is to lay down radiation protection norms and principles, the problem of application being dealt with by the IAEA, the ENA and the European Communities. These same organisations are actively concerned with the safety of nuclear installations, an area in which there are also many bilateral agreements. Arrangements for exchanging information are already well developed, but more needs to be done in terms of the international use of national research facilities and the construction of international installations. Systematic international co-ordination is also required in radioactive waste research. The new EUROCHEMIC programme on waste management, which is to start in 1975, holds considerable promise.

Medium and long-term nuclear research is another area where governments would be well advised to intensify international co-operation. Three examples of the subjects involved are the direct utilisation of nuclear heat, nuclear power units for ship propulsion (with particular reference to questions of safety and port installations) and, above all, controlled thermonuclear fusion. Co-operation in this field, which will continue to be more scientific than technological for a considerable time to come, is already well-established; an international scientific community already exists, somewhat similar to that in disciplines such as astronomy or high energy physics. Moreover, virtually all fusion research in the EEC countries is incorporated in a co-ordinated joint programme. In the future, this co-operation could well be extended to all OECD countries, especially for the construction of future generations of large facilities of the Tokamak type. Co-operation could already be stepped up with regard to certain technolcgical problems such

1) cf. Part III, Chapter II

as the effects of radiation on the materials used in fusion reactors, and facilities such as high intensity neutron sources could be built on a joint basis.

3. Other energy sources

Because of the small amount of research devoted to other energy sources, international co-operation in this area is still extremely limited, often consisting purely in personal contacts between specialists in the various research topics involved. For some years, there has been a solar energy programme at the European Communities joint research centre at Ispra. Recently NATO has undertaken to co-ordinate research in its member states on solar energy, deep-sea thermal gradients and geothermal energy.

This co-operation needs to be considerably intensified and extended, but in general it is the overall question of alternative energy sources which requires an international approach. Apart from increasing the number of research projects undertaken jointly by groups of countries, such co-operation should include the systematic evaluation of the energy potential of these sources and provide the necessary machinery to enable the many projects proposed by specialists in the various countries to be examined at international level.

4. Energy Carriers and related technologies

Electricity research is mainly carried out by the manufacturers of electrical equipment and the electricity generating and distribution undertakings. The initiative for expanding international co-operation in this sector must therefore lie with the firms and public utilities concerned. Governments could nevertheless promote co-operation in medium and long-term research, where their role is often more important. One example is MHD for which a working group, set up jointly by ENA and IAEA, already exists. Another example is the case of other advanced cycle systems. The technology of superconductors for the storage and transmission of electricity is another area where co-operation could be intensified. For the storage of electricity, other important topics suitable for co-operative research are batteries.

However, the sector in which governments should take the initiative is co-operation in other research on energy carriers, although it is essential to involve the firms concerned as far as this is possible. Areas in which co-operation is at present minimal and where special efforts should be made in view of the new interest being shown in most countries include the utilisation of waste heat from power stations, combined plants producing both heat and electricity, and heat transport and storage.

Many countries have now begun research on hydrogen and, more generally on the carriers which would enable heat to be transported in the form of the energy of the chemical bond; co-operation is also advisable here. There is now a programme on hydrogen at the European Communities joint centre at Ispra, but much wider and more systematic co-operation is desirable.

5. Utilisation and conservation of energy

Simply because of the total lack of research on the subject in most countries it is this area where international co-operation is at its lowest level. However, NATO recently organised a seminar on the question and is at present planning to give it greater importance. A very broad basis of co-operation would seem necessary since this research sector is likely to expand in all countries.

It must be borne in mind, however, firstly that most of the research concerned is carried out by industry, and secondly that it is often concerned with "microtechnologies". The main role of governments should therefore be to establish a systematic and very broadly based exchange of information and co-ordination machinery covering all sectors of energy utilisation. Once such a mechanism is set up, it should be possible to identify those research programmes that could best be carried out jointly by a number of countries. Among these, co-operation on development of heat pumps and heat exchanges could be undertaken. An important point to remember here is that the research should cover not only utilisation technologies but also systems of utilisation. It is the latter which perhaps lends itself more easily to co-operation between governments.

6. Energy systems

Joint international research is already being carried out on three aspects of energy systems. The application of systems analysis methods and techniques to energy systems is being studied by the IIASA (International Institute for Applied Systems Analysis); energy economics, and in particular the problems of forecasting supply and demand are well-established subjects of co-operation within the OECD; lastly the many effects that producing and consuming energy has on the environment - in the widest sense of the term and including, for example, its effects on health - are being studied directly or indirectly by a number of international organisations (e.g. the United Nations programme on the environment, the World Meteorological Organisation, the World Health Organisation, the IAEA, the OECD and the European Communities).

Research on energy systems is important in the formulation of energy policies and co-operation between governments in this connection needs to be stepped up and to become more systematic. Research itself should also pay due regard to the fact that energy systems are intrinsically international.

B. SOME PRIORITIES FOR INTERNATIONAL CO-OPERATION

International co-operation in R & D must be viewed as an extension of national R & D and national efforts should be an integral part of overall energy R & D policy. Consequently, any joint action with regard to possible co-operation topics, cannot be planned in isolation and must be fitted into the broader framework of international co-operation with respect to energy R & D policy.

There is no question, however, of attempting to deal with all the topics or sectors mentioned above at once. It has therefore appeared necessary to select certain research fields where it is clear that there is an urgent need for greater co-operation between the OECD countries and where this can be achieved relatively quickly. The selection has been based on four main criteria:

- The quantitative or qualitative relevance for energy production, energy conservation or the formulation of energy policies, of research on the subjects envisaged. The extent of this relevance has been evaluated on the basis of the scientific and technological possibilities considered in Part II. It must also be borne in mind that, because of the very nature of R & D, it is by no means a foregone conclusion that its results will be successful; any contribution it may make can only become effective in the medium and long-term.
- The unquestionable advantage of a more broadly based co-operation, as shown up by the review of the present situation in the foregoing paragraphs. In particular, subjects where co-operation already appears to be satisfactory have not been included, although of course improvements are always possible.
- The absence of major obstacles, whether political, institutional or economic, that would prevent co-operation from being improved. Co-operation is easier in research than in development activities because of the industrial and commercial interests that are involved in the latter. For the same reason, preference has been given to subjects in which governments have a major part to play, although this does not necessarily mean that industry is excluded. In applying

these criteria, consideration has been given to the kind of research involved, and to research policy and organisation in the different countries, as analysed in Chapters I and II above.

- The existence of research programmes on a big enough scale in a number of Member countries. It is clear that increased co-operation is dependent on the extent of national activities. The scale of these programmes also provides some indication of the degree of interest of the countries concerned. The programmes in the various countries are listed in Annex III and summarised in the tables, and the criterion was based on this information.

According to the above criteria, at least fourteen fields, as indicated below, can be considered as most suitable for immediate international co-operation. Obviously, for each subject, the mode and type of co-operation will have to be determined, taking into account the framework in which such co-operation will develop, the R & D performance and potential participating countries and the most adequate procedures and mechanisms. The suggested subjects are the following:

1. Exploration and evaluation of energy resources
2. Underground or sea-bed storage of fossil fuels
3. The coal sector (mining, combustion, gasification and liquefaction techniques)
4. Safety of nuclear installations
5. Radioactive waste management
6. Thermonuclear fusion
7. Solar energy
8. Geothermal energy
9. Energy produced from industrial and urban wastes
10. Fuel cells
11. The use of heat as an energy carrier (covering not only waste heat from power stations but also the transportation and storage of heat)
12. New energy carriers (methanol, hydrogen and, more generally, carriers enabling energy to be transported in the form of the energy of the chemical bond)
13. Energy conservation (rational use of energy) in the residential, industrial and agricultural sectors.
14. General studies on energy systems.

Apart from a few differences in the number and definitions of the above subjects, this list includes all and more topics than the ones contained in the report of the ad hoc Group on International Co-operation on Energy Research and Development of the Energy Co-ordinating Group (ECG/ERD/36 final dated 6th June 1974) set up as a result of the Washington Conference in February 1974.

This similarity is easily explained: the nature of scientific and technological problems does not depend on where they are examined; the subjects have been chosen by a similar process; the criteria used are equivalent if not identical; the data on national R & D activities are the same; finally, there is a common basis of expertise.

It is clear that drawing up a list is only an initial stage and that it needs to be followed by detailed discussion of each subject by specialists from the countries concerned in order to determine which subjects under the different headings might be tackled on a joint basis and what form this co-operation should take. The report of the ad hoc Group of the Energy Co-ordinating Group referred to above would form a very useful starting point for these discussions, particularly where the subjects chosen by that Group are the same as those selected by the OECD Committee for Scientific and Technological Policy.

With no intention of anticipating the outcome of these discussions, the following remarks are offered concerning the forms which co-operation might take and which must be tailored to the scientific, technical, institutional and political aspects and constraints of each subject. Whilst in many areas it would be beneficial to move ahead with co-operative R & D projects, in other cases it may be better to co-ordinate national efforts than to institute joint research programmes or set up joint facilities. Finally, in some instances, a most appropriate form of co-operation, at least at the outset, may turn out to be a systematic exchange of information. The degree to which industry will be involved may also vary from case to case.

Clearly the mecanisms adopted should not only make maximum use of existing international organisations but should also permit special "à la carte" co-operative schemes. It is clear that not all Member countries will be interested in every subject and a relevant point here, is that the OECD provides a particularly suitable framework for co-operation of this kind.(1)

The reseach topics in the above list are still only one aspect of the co-operation that is called for; joint arrangements are also needed for the training of scientists and engineers. As already pointed out,(2) this is one of the keys to success in energy R & D. Scholarships enabling young scientists to train abroad, exchanges of scientists, and refresher courses and advanced-level seminars open to scientists from other countries, all need to be developed systematically.

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1) A provision exists in the budget of the Organisation (Part II of the Budget) which allows for co-operative schemes between only those countries which are interested in a given subject.

2) Cf. Part III, Chapter I.

It is worth stressing that whilst OECD countries may not be able to cover individually the whole field of energy research on their own, their co-operation in specific and different topics of their choice will enable them to be active jointly on all research fronts. This is not merely a desirable objective; it is essential and means that work will have to be distributed in the best way possible.

The purpose and scope of this report was not to make a close and very detailed examination of the possible co-operation areas, and the above suggestions represent therefore an incomplete listing in general terms of the possible themes of co-operation between the OECD countries. Further examination of suitable fields for bilateral and trilateral co-operation should be undertaken by individual countries using, for example, as a basis, the list of national programmes given in Annex I.

It is also important to underline that the approach adopted here, based on research needs and on present and future programmes, need not be exclusive. A group of countries that has decided to pursue a joint energy policy may find it more appropriate to approach the question of scientific and technological co-operation by identifying the research sectors and type of organisation on which this common energy policy might best be based.

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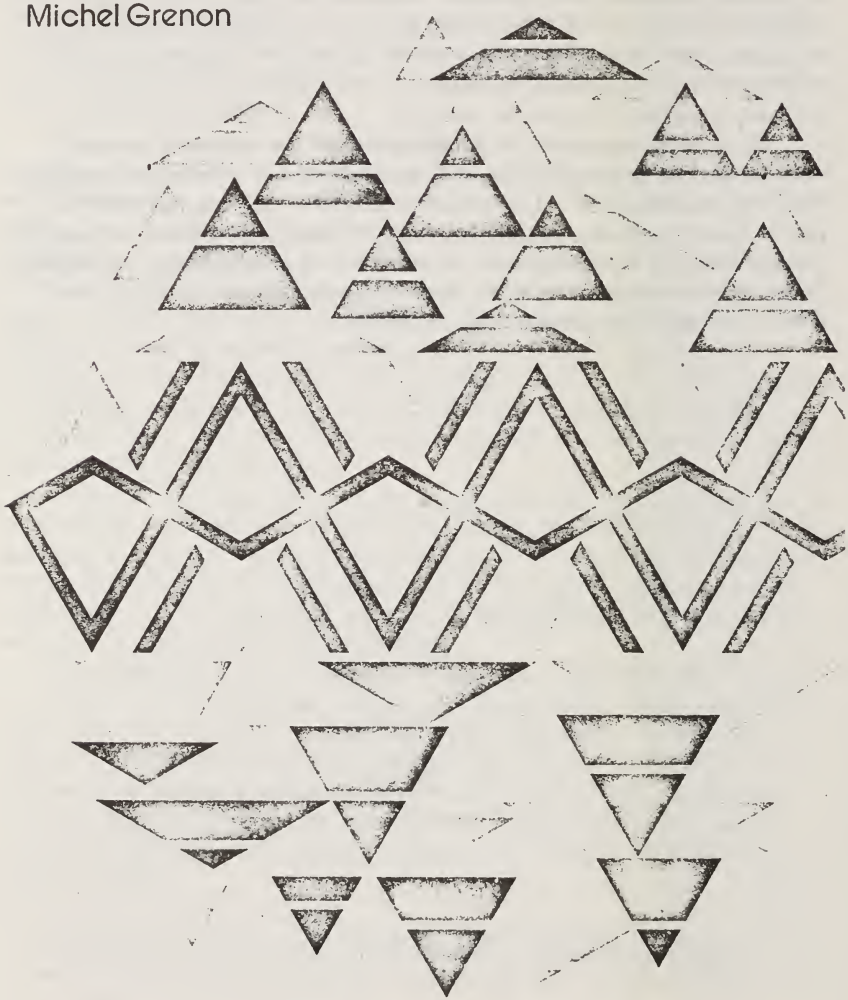

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Part II

Energy Research and Development in Industrialized Countries Other Than the United States

Michel Grenon

Chapter Five

Summary and Conclusions

This study has been an attempt to appraise energy research and development in major industrialized countries outside the United States, before the energy crisis erupted in late 1973. Its aim was to discover which options each country has investigated, the budgetary support given, the relative contribution of private and public organizations, and the governmental mechanisms used.

GENERAL ATTITUDE TOWARD ENERGY SUPPLY AND ENERGY R&D IN INDUSTRIALIZED COUNTRIES

Before environmental problems and oil supply availability brought new factors into play, it was generally considered in Western Europe's industrialized countries (and apparently in Japan as well) that there were two poles for any energy policy: (1) self-sufficiency, or (2) low cost of supply. There is no question that, facing their coal "crisis" (end of the 1950s in Europe), industrialized countries chose the low costs, with imported oil. They tried to allay any fears they had about dependency by dealing with more than one producing country. Recent history has shown this solution to be an illusion, shattered when the various producers united together under the same banner.

While it was still an illusion, however, imposed low prices of Middle-East oil became a "reference." As a result, noncompetitive coal mines were systematically closed, in spite of the fact that, in Europe, coal reserves are evaluated at 350–400 billion tons (which may be equivalent to total oil reserves *in the world*).

Nuclear energy, developed first for military and political reasons, was considered in the mid–1950s (after the first Geneva Conference on Peaceful Applications of Atomic Energy) to be a possible universal (and miracle) solution. But after the first enthusiasm, it became clear that this solution would not be so

easy. This initial enthusiasm and subsequent discouragement is reflected in the history of Euratom. After the Suez crisis of 1956, the Three Wise Men of Euratom proposed an "ambitious" nuclear program, which soon appeared "unrealistic" and was eventually abandoned.

Almost twenty years later, this program is finally being accomplished, but under different conditions. By the mid–1960s, with the United States making a massive start on its commercial LWR program, nuclear power again promised to become more or less competitive. On this assumption, Europe could plan to stabilize in the medium term (possibly around 1985) its import of oil, although at rather high levels, by stepping up nuclear power development.

Then came some warnings that access to the cheap oil reserves would not last forever (after the Teheran agreement, February 1971). The result generally was a gentle acceleration of nuclear programs, with the competitive situation of nuclear electricity gradually gaining ground; however, no serious program was aiming toward other applications, such as nuclear process heat. The relative position of electricity on the energy market was the main winner of this new situation.

With the oil crisis, nuclear development programs were still further accelerated. In France and Italy, for instance, for power production; in Germany, nuclear process heat received a growing interest.

Notwithstanding various and diversified suggestions, there were no serious attempts to utilize other possibilities. In both Europe and in Japan, all kinds of resources or new energy techniques have been investigated, at one time or the other–from wind to geothermal energy, from thermal gradient of the oceans to solar energy conversion. All were ruled out as commercial alternatives, often on the basis of outdated economic and technical studies. In any case, the energy alternative inevitably was demonstrated to be much more expensive than past oil, or future nuclear.

Although it may be that Europeans are simply reluctant to change their minds, it must also be recognized that Europe's resources are *not* comparable to those of the United States (coal, oil, shales, geothermal . . . and sunny deserts!). But still, there did seem to be a stubborn resistance to looking at energy possibilities other than nuclear, a point to which we will return. This was less true of Japan, which had initiated a broad assessment of various possibilities. Now, after the events of late 1973, other countries have started assessment programs on new energy resources.

Could this research on new energy resources be performed on an international, or at least on a European basis? Perhaps, but it would need more conviction on the part of all concerned. Surprisingly, only two energy R&D programs are efficiently coordinated in the European Community: research on coal (fuel from the past), and research on thermonuclear fusion (energy for a far future).

As for conservation of energy, no such program turned up, nor was

the subject mentioned, except in a Swedish personal communication received during this inquiry. As the reference cost of energy was low-cost Middle-East oil, it can be said that the "reference level" of energy consumption was that of North America, about three times that consumed by the industrialized countries. Although not conservation-minded in those precrisis times, some organizations took proud note of the low gasoline consumption and high performances of the European and Japanese automobiles. But the best proof that conservation could have been studied earlier is that it is intensively studied now.

The social value of scientific and technical research in general has been questioned in Europe, as it has been recently in the United States, not so much in the scientific community itself, but more generally by politicians, and sometimes by the general public. An interesting document[a] has been published by OECD, on the aims and objectives of R&D. Concern over its social impact has surfaced in the United Kingdom, France, Germany and elsewhere. Some R&D budgets have been stabilized, or even decreased in relative value (in France, but not in Germany and Japan, starting in fact from a lower value), but all countries have been looking for a more efficient and more socially-oriented utilization.

There may be no direct connection, but at the same time, many among the biggest nuclear research centers have "diversified" some of their activities into nonnuclear and *nonenergy* sectors. This may appear somewhat paradoxical at a time when nuclear energy has been exclusively chosen as the energy solution of the future, and when it is clear that all its problems are not completely solved, not to speak of the potential interest of other energy alternatives. But now there is a tendency to correct this situation, and many nuclear centers have expressed interest in new energy resources R&D.

Finally, regarding pollution, although the problem is generally less severe in Europe than in the United States and in Japan, this had a much greater impact on R&D than the "supposed" energy crisis, until late 1973. In all countries, energy R&D includes a sizable effort on pollution problems and pollution abatement. Stack gas cleaning and scrubbing, fuel desulfurization, new refining processes and new products, thermal discharges, siting problems, and so on are intensively studied, and possible solutions are tested.

COAL RESEARCH AND DEVELOPMENT

The largest—though declining—coal production is in the United Kingdom; in the other coal countries (Germany, France, Belgium, Netherlands, Japan), coal production has actually shrunk, and the coal industry has generally faced tremendous financial and social problems.

Most of the R&D has been in the "retreat" spirit, except in the United Kingdom where it is sound, but largely market-oriented (development of coal uses).

a. "Science, Growth and Society: A New Perspective," OECD, 1971.

Energy R&D in Industrialized Countries Other Than the United States

There are few, if any, studies on desulfurization, because European coals are low in sulfur. (In Europe, the sulfur problem is mainly related to oil and heavy fuel oil, especially from the Middle East, which is the main supplier, with an average sulfur content of around 3 percent). The cost of coal is so high, and the utilization of natural gas sufficiently low in most countries (until the discoveries in the Netherlands and in the North Sea), that there has been no economic incentive to study coal gasification. There are two exceptions: in Germany, researchers are investigating nuclear coal gasification, and in the United Kingdom, gasification research (developed successfully through many years of reliance on coal gas) now is being continued primarily for export to the United States. (The British, with their new supplies of natural gas from the North Sea, no longer need gasification for their own use.)

Coal mine safety, a problem as old as mining itself, is a continuing concern in the industrialized countries, with a continuing search for safer mining equipment and techniques.

Research and development has also focused on production and on utilization of coal. Production has progressively been concentrated in high-performance mines (others being closed), and research is aimed at increasing it; studies are made on fast-working tools, long wall equipment, drilling of galleries, rock mechanics, methane release and climate (mines going deeper and deeper, automation, and so on).

Utilization research has concentrated primarily on power production (declining) and on steel manufacture. For production of coke for use in steel-making, some interesting studies have been made of methods to extend the range of coking coals. In the United Kingdom, where 50 percent of the coal is used for power production, researchers in both the coal and power industries are studying combustion, fluidized bed combustion (jointly with the Office of Coal Research of the United States) and related processes. In the United Kingdom, where domestic uses of coal are still important (and coal authorities are not prepared to lose them), studies continue on various smokeless coals or coal mixtures.

Excepting thermonuclear fusion, still in the pure research phase, coal is the only sector of energy where R&D is coordinated among the various European countries. The United Kingdom, Germany, France, and Belgium each has its individual research laboratories (which date back to before the European Communities) and individual programs (mainly for specific problems and for studying new commercial coal products). However, the most important studies related to production—safety and coking—are coordinated and sponsored by the Communities in Brussels. Between 1957 and 1972 (before the Community expanded from six to nine members, with the United Kingdom, Denmark and Ireland), the share of Communities expenditures in coal R&D totalled 43 million UC;[b] from 1970 to 1972, the Communities' share was roughly 3.5 million UC,

b. UC: European Unit of Count.

and represented about 10 to 15 percent of total coal R&D of the six member countries.

OIL RESEARCH AND DEVELOPMENT

Oil is buried deeply in the ground, and the secrets of its R&D are also well hidden. Unless the well runs dry. . . .

Oil business in industrialized countries is shared between international oil companies (mostly the seven major ones: Exxon, Gulf, Mobil, Standard Oil of California, Texaco, of the United States; Royal Dutch Shell of United Kingdom and the Netherlands; and British Petroleum of the United Kingdom; plus a few independents, such as Continental, Occidental, Phillips, etc.), a few national oil companies (with very different experience and ability, high for the oldest ones, less for the most recent ones), and numerous independent refiners (mostly in Germany and Japan).

The five U.S. Majors have various large research organizations in industrialized countries, but almost exclusively devoted to product development, refining processes improvements, petroleum chemistry, and other processes; that is, the R&D is mostly market-oriented. This contribution is important, and there is fruitful exchange between the U.S.-based and the foreign-based research organizations and laboratories; but to our knowledge, most and possibly all of the research related to exploration and production (in which we were mainly interested in this inquiry) is performed in the U.S. organizations of these companies.

The European-based Majors, namely Royal Dutch Shell and British Petroleum, own and operate very large research organizations and laboratories, about which they are not too eager to talk. Royal Dutch Shell has a reputation for high-quality work, but it is kept as confidential as possible. Many research projects are process- or product-oriented. As far as exploration and production are concerned (and this is usually the part of R&D kept most secret by all the oil companies in the world), there is a difference between the two companies: BP has traditionally owned some of the richest oil fields in the world, and produced more than it could refine, while Royal Dutch Shell has been traditionally short of rich fields (except in Venezuela), with the need to buy crude to adjust to its refining capacity, and with consequently greater incentive to improve exploration and production.

Perhaps the reason it is so difficult to discover information about some sectors of the R&D performed by international oil companies is that actually they have not been performing that much. . . . It is possible that until late 1973 there was little profit incentive to pursue R&D, as long as oil production costs (mainly in new areas like the Middle East) were so low.

Among the European oil companies, it seems that the highest volume of integrated R&D is performed in France, through the joint collabora-

tion between French oil companies and the rather unique IFP (French Petroleum Institute); of particular importance is an intensive off-shore research and development program.

Practically everywhere, many studies are now devoted to environmental protection, such as crude or fuel oil desulfurization, pollution abatement in automobile engines, and so on.

GAS RESEARCH AND DEVELOPMENT

Conversion from town gas (produced initially from coal, and then from oil) to natural gas is quite recent in most industrialized countries outside the United States; it is not yet accomplished in Japan, which is awaiting LNG import increases in the coming years. In Europe, it was started by the post-World War II gas field discoveries in Italy and France, was boosted by the discovery of the very large gas field of Groningen in the Netherlands in 1959–1960, and followed, for the United Kingdom, by important discoveries in the North Sea. But natural gas is not expected for the time being to supply more than 10 percent, or 15 percent at best, of the total energy mix in most industrialized countries. This percentage will be considerably less for Japan, and consistently higher for the Netherlands, of course, where it may reach 30 to 40 percent.

Usually, exploration for and production of natural gas are the responsibility of oil companies. Transport and distribution are accomplished by gas utilities, some of them covering the whole national territory and publicly owned. Most R&D is oriented toward the quality of the service, and the promotion of new utilizations. In the United Kingdom, for instance, more than 50 percent of R&D funds (totalling between £5 and 6 million per year)[c] of the British gas utility is devoted to development and improvement of gas uses and to new applications.

Some studies are being conducted on gas production from oil or naphtha, and on farther-away processes such as nuclear coal gasification and nuclear hydrogen production. Important studies have been done (mainly in France) on natural gas liquefaction and LNG transportation.

ELECTRICITY RESEARCH AND DEVELOPMENT

The electricity sector is both the most traditional and the most future-oriented (because of nuclear energy) in the industrialized countries we have studied. No doubt electricity will benefit the most from the changing oil situation. If the countries had continued to rely on a declining and expensive coal resource, or on "fluctuating" oil imports, the future of electricity development in these countries perhaps might have been somewhat compromised; with nuclear energy

c. $12 to $14 million in U.S. dollars.

prospects, it is bright, and even generally encouraged by many governments, which consider it the main—if not the only—route to an improved energy self-sufficiency. However, "Projects Independance" are still a distant prospect.

In all countries studied, we have found quiet, sound programs of R&D covering practically all sectors, from production to transmission, from distribution to utilization. Due to the fact that thermal production through fossil fuels will still dominate electrical energy for many years, most of the studies in the sector have been reoriented towards environmental protection, such as gas stack treatment, fuel desulfurization, fluidized bed combustion, chimneys studies for dispersions of pollutants, thermal discharges, etc. Nuclear power production is mostly studied by national nuclear authorities and by industry.

The biggest shift in R&D programs perhaps is found in the development of new electricity uses: electrical heating (mainly for households, and progressively for special industrial or agricultural applications), and the electric car, for which there is a growing interest for urban uses.

Magnetohydrodynamic generation was much in favor during the last decade. Many R&D programs on MHD have been discontinued; others are continuing (mainly in Germany and in Japan). In general, little effort has been devoted to other methods to improve the conversion efficiency, either by topping cycles (potassium vapor) or low-temperature cycles (freon, isopropane); again, this is probably a result of the low cost of fuel oil.

The same comment applies to fuel cells as to MHD. There was a peak of enthusiasm and support for these programs. There is much less now. It is not clear how the oil crisis may change these situations.

NUCLEAR ENERGY RESEARCH AND DEVELOPMENT

The major energy R&D programs fall under this category. Taken altogether, the nuclear programs of the industrialized countries (if only civilian applications are considered) largely exceed the United States program. Two of the largest programs, the German and the Japanese, have no military application at all.

In the beginning, the industrialized countries considered almost all possible types of burners, and the main type that was partially developed by the United Kingdom and France was the natural uranium-graphite-gas-cooled reactor. Now, like the United States, most have finally chosen Light Water Reactors (LWR), generally starting with American licenses, and aiming for subsequent independent national developments. The United Kingdom has made another choice with the Advanced Gas Cooled Reactor (slightly enriched), but is it definite?

For second choice, although many people would name the High Temperature Reactor (HTR), it is not clear which type is really second, the HTR

or the Liquid Metal Fast Breeder Reactor (LMFBR). If estimates were based only on achievements, we would say the LMFBR is ahead, with two prototypes in operation, the French Phoenix and the British PFR (to say nothing of BN–350 in the USSR), as compared to only one prototype HTR under construction (the Pebble Bed type, in Germany, due to operate in 1976). But of course there remains uncertainty, and the HTR benefits from the commercial success of this reactor on the U.S. market through General Atomic. At any rate, the total effort (however dispersed it is among various nations) on LMFBR exceeds by far the total effort on HTR.

There are some interesting programs on nuclear process heat, mainly in Germany (coal gasification, methane reforming, long-distance heat transportation through chemical energy) and in Japan (nuclear steel-making). Some recent announcements point to increased efforts in this direction, as well as to obtaining nuclear hydrogen though thermochemical water-splitting. This can also increase the interest in the HTR.

Unfortunately, most of the industrialized countries are as short of uranium as they are of oil. France, with about 60,000 tons, is the exception. The others will have to look intensively for foreign sources of uranium.

Two separate large programs have developed uranium enrichment techniques: gaseous diffusion and gas ultracentrifuge. Other possibilities are being studied. It is clear that in the next decade, industrialized nations in Europe, and Japan, will reach some degree of "enrichment self-sufficiency," this degree probably improving with time.

The high quality of the R&D in nuclear energy in the industrialized countries cannot be denied. Unfortunately (this is a personal opinion), it could have been still higher with faster results if duplication-multiplication could have been avoided. Within the six-member European Community there was a tentative attempt toward unification of the R&D program with Euratom, but it collapsed in such dramatic failure that "Euratom new style" has almost nothing more to do with nuclear energy, except for thermonuclear fusion, which will be discussed later.

Unity has been replaced by multiplicity, and a common program by a variety of multinational enterprises. The associates for centrifuge enrichment, for instance, are quite different from those associated for LMFBR, etc. To the layman, the make-up of these associations seems to rely more on game theory than on energy policy. As a result, there are more than twice as many reactor manufacturers in Europe (and still more if Japan and Canada are included) than in the United States (five only), for a program of construction which is less than half the present U.S. program.

NONCONVENTIONAL ENERGIES RESEARCH AND DEVELOPMENT

It seems impossible to mention any nonconventional source of energy—even the most exotic ones like energy of the ocean waves—and not find at least a small

group (and very often more than one) working with enthusiasm for these new prospects. But, as far as we have been able to judge, these researches have not received any strong financial or political support, at least prior to the 1973 oil crisis. The only exception seems to be thermonuclear fusion, appropriately supported and even (a noteworthy exception) efficiently supported and coordinated by a Euratom common program.

Introduction of a new energy technology needs a "tunnelling effect," usually through government funds or incentives to overcome the "potential barrier" of economic disadvantage. Most of the industrialized countries have generously provided these funds for implementation of nuclear fission and, to a lesser extent, for nuclear fusion. They have appeared not to wish to sponsor a competitor to their cherished child, nuclear energy, certainly not competitors (such as solar energy) about which they have publicly expressed their doubts.

CONCLUSIONS AND RECOMMENDATIONS

The present study, though incomplete, indicates clearly that most of the industrialized countries, in spite of short supplies of cheap domestic energy, have not relied much on the potential of research and development programs, other than nuclear development, to ease their energy situation. Most of these countries, if not all, have relied massively on oil imports, on the assumption that such a situation would last at least until their nuclear energy could take a growing share of the burden. Apparently, since the late 1973 oil crisis, some countries have started a thorough assessment of new energy resources (especially Japan); it is difficult to say, for others, if it is more than lip-service for the time being.

As a conclusion, our opinion is that the United States has wasted its abundant energy resources by using them too freely and carelessly; we think that other industrialized countries (and this is especially true for domestic coal resources) have wasted their scarce energy resources by deciding *not* to utilize them (a closed mine is often a lost mine), and by not capitalizing on their vast human resources to find energy solutions. Instead, they settled for an inadequate R&D effort incapable of meeting a severe energy situation, one which they had fatalistically to accept. This does not mean that nothing has been done, but it is our conviction that much more could have been accomplished.

In his April 1973 Energy Message, former President Nixon mentioned the possibilities of broad international cooperation for energy R&D. During the recent oil crisis, Secretary of State Henry Kissinger invited other nations to coordinate energy R&D. Highly desirable as these goals might be, our past experience suggests the need for caution in this field. Unfortunately, most international organizations are very difficult to create (the more so the bigger they are), and need a long lead time before becoming operative. If such an objective were to be pursued, the best approach would probably be to assign long-term projects to such an international organization.

Nevertheless, intermediate steps on this road could bring faster results. There is in most of the industrial countries a very high potential of energy R&D teams, whose efficiency could be boosted by clear and well-defined, limited objectives. Joint ventures (as Conoco-British Gas, Exxon-Alsthom, etc.) seem objectively to be a good solution. This suggestion for "ad hoc" joint developments is not contradictory with the reservations we expressed about some of the multinational associations in nuclear Europe: these associations were not made to fit into a larger political framework with long-term goals, but were pragmatically aiming only toward better short-term efficiency.

Finally, we think that it would be highly beneficial for all concerned if an international conference on energy R&D could be organized in the not too distant future. We remember how much all industrialized countries benefited from the first Atomic Conference in Geneva in 1955. Such an international conference on energy R&D would benefit the whole energy community as well.

LIMITS OF THIS STUDY

Conducted over a period of nine months, this study involved canvassing several countries on a variety of factors in their energy R&D. None of these countries publishes a catalog of energy R&D programs, and most of the energy research is scattered in various separate organizations. Even in the countries with a fair amount of R&D centralization, energy per se was generally not a "Head Chapter" for listing of the R&D activities.

The canvass of countries and organizations for this information did not yield uniform results. Most of those contacted (with a few exceptions) supplied generously the information they had. Even so, the information was not uniformly useful, some data requiring more contacts and discussions than the study allowed. Some organizations replied that they had no available information on the subject for the time being; finally, a few organizations may inadvertently have been passed over.

It should be noted that most of the information and *opinions* were gathered before the energy crisis became more acute in America, and progressively so in Europe. Collected now, some of these opinions could well be different.

In the course of this study, we discovered that various countries (Sweden, Japan, etc.) and organizations were surveying energy R&D activities.

The Research Committee from the OECD is said to be preparing an international document inventorying energy R&D, though not for publication, and it is understood that the Joint Group for Energy and Science of this same organization has been preparing a study of coal technology. Under the leadership of Mr. Johnson, from the U.S. Bureau of Mines, this synthetic study focuses on various new technologies in the coal sector, to assess the status of development, needed amounts of coal, environmental factors, and so on, the main purpose being to assess the influence of such coal technologies on future coal demands.

The European Communities have also started a broad inquiry on energy R&D programs in the member countries. Questionnaires have been prepared and sent to national organizations with a listing of all possible activities, and a computer program has been prepared for treatment of data sheets. The time span of this study is uncertain, perhaps a year or more.

Much profitable work remains to be done in the area that this study covers, especially by covering a greater number of countries and organizations, by describing in fuller detail the specific R&D programs of interest, and by trying to assess the fall-out (and possible modifications) due to the actual energy crisis.

PRESENTING THE MATERIAL

We considered two possible methods of assembling the information, both of which would be useful in any subsequent, broader study. The first one was a mere listing of research organizations and research facilities, such as the complete ones established by the International Union of Electricity Producers (UNIPEDE) for experimental facilities in electrical research. This would have required more time and staff work than was allowed. The second method, which was the one chosen, though less complete, is more descriptive, and thus likely to be better suited to a general understanding of the energy R&D situation in industrialized countries. In this approach, we summarize briefly the energy situation in each country, describe the general organization for R&D, and review the R&D currently being pursued.

The summaries of each country's energy situation serve to put R&D in perspective. It is clear that a country without any domestic coal resources has little reason to perform coal R&D; but the picture is different with a country with declining coal resources. In most countries in Europe, for example, the coal industry has met enormous technical and financial difficulties. A country faced with these problems can decide either to launch a massive R&D program to salvage its valuable coal, or to resign itself to minimum activity. Such a choice depends on the structure of the energy industry, and on governmental energy policies; on both, we have made a few comments when it seemed appropriate.

In summarizing the general organization for R&D, we have not tried to define R&D, on which many experts do not agree, nor to take it in its broadest aspect. Tentatively, we have tried to emphasize the respective responsibilities taken by governments and industry in the various countries. We have relied somewhat on the very interesting studies of OECD on research policies, although some of them are unfortunately out of date, and more oriented toward basic research.

The review of main energy research and development concentrates on fuel sectors, on electricity and, when available, on nonconventional energy resources and techniques.

As for any international study, we faced the problem of units,

Table 5–1. Production and Consumption of Energy, 1971 *(in million tce)*

Countries (Population in 10^6)	*Production*					*Consumption*				
	Solid fuels	*Liquid fuels*	*Natural gas*	*Primary electri-city*	*Total*	*Solid fuels*	*Liquid fuels*	*Natural gas*	*Primary electri-city*	*Total*
Canada (21.8)	16.0	94.0	94.0	21.0	225.0	24.0	96.0	61.0	20.0	201.0
France (51.2)	33.8	2.5	9.6	7.3	53.2	48.1	132.2	15.5	7.3	203.1
F.R.Germany (59.2)	148.5	9.6	18.7	2.5	179.3	141.0	169.4	26.5	2.5	339.4
Japan (104.7)	33.0	1.0	4.0	11.0	49.0	80.0	245.0	6.0	11.0	342.0
Sweden (8.1)	–	–	–	6.5	6.5	1.5	37.5	–	6.5	45.5
U.K. (55.6)	150.4	–	24.8	3.8	179.0	147.8	131.7	26.0	3.8	309.3
U.S.A. (207)	505.0	637.0	848.0	39.0	2,029.0	452.0	970.0	867.0	39.0	2,328.0

Source: Based on UNO statistics. Some of these figures may differ somewhat from figures given by the specific countries in the reports.

physical and monetary. We have generally used the metric system, and more specifically, for energy-mix tables, the TCE or ton of coal equivalent, as it is used in United Nations statistical publications (unless figures were given otherwise), with accompanying rough U.S. conversions, and we kept financial information in the national money in which it was provided, to avoid the problem of fluctuating changes (giving the approximate dollar value as of beginning 1974).

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SUMMARY OF ACTIVE INTERNATIONAL AGREEMENTS, COOPERATIVE ARRANGEMENTS, AND INFORMATION EXCHANGE ACTIVITIES CURRENTLY IN EFFECT IN THE FIELD OF ENERGY RESEARCH AND DEVELOPMENT

The United States Energy Research and Development Administration (ERDA) participates in active multilateral energy research and development agreements with international organizations such as the International Energy Agency (IEA), the International Atomic Energy Agency (IAEA), and the NATO Committee on the Challenges to Modern Society (CCMS).

- A brief description of the objectives and organization of the IEA, and a summary of the current status of ongoing and proposed areas of energy research and development cooperation are provided in Attachment 1.

- Under the auspices of the CCMS, the United States has been designated as the pilot country for energy research and development in the areas of solar energy, geothermal energy, and the rational use of energy.

- As an active member of the IAEA since its establishment in 1957, the United States has been strongly involved in all IAEA program activities. ERDA serves as the lead agency for coordinating U.S. technical participation in and support of the programs of the IAEA. The U.S.-IAEA Bilateral Agreement for Cooperation facilitates U.S. support of the IAEA. Under this enabling agreement, the United States can make available to the IAEA or, through the IAEA, to its member states nuclear material or equipment under IAEA safeguards. Additionally, in support of the IAEA scientific and technical information program, U.S. nuclear experts participate in a wide range of specialized meetings on a great number of subjects in which information is made available on research and development activities in the U.S. The U.S. is a major contributor to the IAEA's International Nuclear Information System (INIS), which indexes and abstracts publications in the nuclear field from throughout the world for circulation in the ATOMINDEX.

ERDA plays a significant role in a total of 28 active bilateral energy research and development arrangements with corresponding foreign agencies. These arrangements are summarized in Attachment 2.

The United States has a total of 33 bilateral agreements for cooperation with foreign governments and international organizations concerning the peaceful uses of atomic energy. These bilaterals are essentially enabling agreements. Their main purpose, in accordance with statutory requirements, is to provide the framework for United States export of reactors and fuel materials under appropriate safeguards. A list of these agreements is in Attachment 3.

Attachments:
1. The International Energy Agency
2. Summary of Active Bilateral... Foreign Agencies
3. Agreements for Cooperation in the Civil Uses of Atomic Energy

Attachment 1

THE INTERNATIONAL ENERGY AGENCY

A. Background

The oil embargo of 1973 and the almost simultaneous increase in world oil priced severely disrupted the economies of most oil-importing nations and strained their political, strategic, and economic relationships. The United States and certain other members of the Organization for Economic Cooperation and Development (OECD), based on the need demonstrated by that experience, have undertaken to achieve a coordinated approach to decrease their dependence on foreign oil, and to reduce the strategic and economic vulnerability such dependence can cause.

As part of this effort, the United States and certain other OECD members agreed in September 1974, to develop an International Energy Program (IEP) for sharing energy imports in times of emergency, and for cooperating on other energy programs such as research and development. The International Energy Agency (IEA) was established as an autonomous institution within the OECD to administer, monitor, and execute the IEP.

B. Participants

In addition to the United States, the other OECD members who are participating in the IEA are: Austria, Belgium, Canada, Denmark, the Federal Republic of Germany, Great Britain, Ireland, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, and Turkey. Subsequently, New Zealand became a participating member and Norway became an observer. Under special arrangement (Article 72 of the basic agreement), the Commission on European Communities also participates.

C. Purposes

The IEA was established to:

1. Promote secure oil supplies;

2. Develop an emergency self-sufficiency in oil supplies, restraining demand and allocating available oil among member countries on an equitable basis;

Attachment 1

3. Promote cooperative relations with oil-producing countries and with other oil-consuming countries, including those of the developing world; and

4. Reduce member-country dependence on imported oil by undertaking long-term cooperative efforts.

D. Organization

The IEA organization comprises: a Governing Board, a Management Committee, Standing Groups on Emergency Questions, the Oil Market, Long-Term Cooperation on Energy, and Relations with Producer and Other Consumer Countries and Subgroups within the Standing Groups.

1. Standing Group on Long-Term Cooperation on Energy (SLT)

Of particular interest to the Energy Research and Development Administration (ERDA), this Standing Group will focus on reducing IEA member dependence on imported oil, over the longer term.

Pursuant to Article 42 of the IEP agreement, this group was to consider four areas in particular:

a. Energy conservation, including cooperative programs on general information exchange, and on ways and means of reducing the growth of energy consumption;

b. Development of alternative sources of energy such as domestic oil, coal, natural gas, nuclear energy, and hydroelectric power;

c. Energy research and development (R&D), including the priority cooperative programs which are described in paragraph F below; and

d. Uranium enrichment, including projects to facilitate development of natural uranium resources and enrichment services.

2. Subgroups

Subgroups were established within the SLT for each of these four areas. The energy R&D subgroup was mandated to carry out cooperative programs in energy research and development as agreed to by two or more participating

countries.* In November 1975, the Energy R&D Subgroup was changed to a committee, mandated to work closely with the SLT to assure a coordinated long-term program.

E. Guiding Principles

Broad guiding principles governing R&D cooperation in the IEA were prepared by the Energy R&D Subgroup and have been adopted by the Governing Board. Guidelines governing treatment of information and intellectual property in forthcoming cooperative arrangements have also been adopted by the IEA Governing Board. The treatment of these matters (proprietary information, data, patents) in actual agreements, especially those which have commercial participation or implications, is significant in determining the future course of international energy R&D cooperation which involves governmental participation.

F. Current Status of Ongoing Cooperative Technical Programs

Nine technology areas for multilateral cooperation were identified in the IEP. The IEA R&D Subgroup, under the chairmanship of Dr. Wolf Schmidt-Kuester of the Federal Republic of Germany (FRG) Ministry for Science and Technology, established expert groups in each of the nine areas to develop cooperative programs. Most progress to date has been made in the areas of coal technology and nuclear reactor safety.

The status in each one of the nine areas is as follows:

1. Coal Technology -- Multilateral Agreements were signed on November 20, 1975, establishing a coal resource data bank and information service, mining technology clearinghouse, coal technical information service, and an economic assessment service. ERDA is the responsible U.S. organization for the latter two agreements; the Department of Interior for the first two. In addition, an agreement was signed on November 20 between the U.S. (ERDA), U.K. and FRG to construct and operate in the U.K. a fluidized combustion research facility at a capital cost of $15-20 million.

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* Except in the case of the Standing Group on Emergency Questions, Standing Group project participation is strictly voluntary. For example, in energy R&D, only those countries interested in a particular activity or cooperative project will participate.

Attachment 1

2. Nuclear Reactor Safety -- The main focus is cooperative programs at ERDA-owned, NRC-financed, reactor test facilities: LOFT, PBF, and PFE.. Cooperative experiments at these facilities involving quid pro quo arrangements as well as financial contributions are being negotiated. A U.S. (NRC)--German agreement has been signed providing FRG contributions of $1 million/year for the LOFT program. A similar agreement with Japan is expected shortly. Facilities in Germany (HDR at Grosswelzheim), Japan (NSSR at Ibaraki), and elsewhere are also expected to be made available for cooperative experiments. International participation in design review of and in construction of instrumentation for the proposed U.S. liquid metal Safety Research and Experiment Facility (SAREF) has been offered. Cooperation on other fast reactor safety subjects is being developed.

   Other agreed activities include the compilation of an annual nuclear safety research index, a multilateral agreement to exchange technical information and reports on reactor safety, cooperation in the Oak Ridge heavy steel technology program and continued use of the Marviken Facility in Sweden.

3. Radioactive Waste Management -- A cooperative program on disposal of radioactive waste into geologic formations is being planned as well as a program on conditioning and storage of wastes. Other topics, including seabed disposal, are under active discussion.

4. Controlled Thermonuclear Fusion -- A Fusion Power Coordinating Group has been established to focus on developing cooperative programs on intense neutron sources, superconducting magnets, plasma-wall interactions, and to explore increased cooperation in the design, construction and operation of large experimental devices. A draft agreement for foreign participation in the R&D program in connection with construction of the intense neutron source at the ERDA Los Alamos Scientific Laboratory has been circulated to interested IEA countries.

5. Conservation R&D -- Cooperative efforts are being developed on thermal characteristics of buildings, heat pumps, thermal storage for residential and industrial conservation, and heat transfer research/heat exchanger development. Specific projects are being defined and draft multilateral agreements are being circulated.

6. Solar Energy -- Cooperative activities on solar heating and cooling of buildings and on solar insolation measurements are being planned. Five subgroups have been established to plan joint activities including development of components for heating and cooling, testing collector thermal performance and developing insolation instrumentation.

7. Hydrogen -- Four working groups have been established to coordinate efforts on: electrolytic hydrogen production, thermochemical production schemes, interface with nuclear heat sources, and analytic and assessment work. Interaction to date has been most active on thermochemical cycle and electrolysis work. In addition to promoting agreement on definition, standard units, analytical and evaluation methodology, and criteria for the groups are promoting informal and formal information exchanges leading to future joint R&D.

8. Municipal and Industrial Waste -- An information exchange to report on ongoing and planned national activities to produce energy from waste and to save energy through materials recycling is underway as a basis for formulating future joint work.

9. Waste Heat Utilization -- The current German program on heat mapping is forming the basis for possible joint studies. Information is being exchanged on national activities concerned with using rejected heat from electrical power plants. Information on combined heat/power systems (such as the U.S. MIUS program) is being exchanged.

G. New Cooperative Efforts in Energy R&D

At its November 20-21, 1975, special meeting on research and development, the IEA Governing Board approved undertaking cooperative work in seven new technology areas (high temperature reactors for process heat, geothermal energy, solar power systems, wave power, wind energy, ocean thermal energy, and biomass conversion) as well as in energy systems analysis. Expert groups will meet to evaluate joint interests and propose cooperative work of mutual benefit in these seven areas. The systems analysis work will be undertaken by national experts and by two international groups to be established, one at the ERDA Brookhaven National Laboratory and the other at the Julich Laboratory in Germany. The effort has as its aim the identification and evaluation of

Attachment 1

energy technology options, their potential energy contributions for the various countries and their time scale of commercial implementation, as well as providing advice on R&D priorities for the individual nations and collectively for the IEA member states. In the course of these studies, data on energy resources, demands for the various energy forms, environmental factors, interfuel substitution possibilities, etc., will be collected and made available.

Attachment 2

SUMMARY OF ACTIVE BILATERAL ENERGY RESEARCH AND DEVELOPMENT ARRANGEMENTS INVOLVING ERDA AND CORRESPONDING FOREIGN AGENCIES.

COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
Germany (Federal Republic)	Radioactive Waste Management	Exchange of data, visits and meetings on retrievable storage, disposal, and transportation aspects of radioactive waste management. Began 1974 for five years.
Germany (Federal Republic)	High Temperature Reactors	Exchange of personnel and documents, visits, and conferences on high temperature reactor fuels, including reprocessing. Began 1971 for five years. Discussions are underway for expanded cooperation.
Germany (Federal Republic)	Fast Reactors	Exchange of personnel, visits and data on fast reactor research. A significant number of technical reports have been exchanged. Began 1962, open ended. Discussions are underway for expanded cooperation.
Japan	Broad Cooperation in Energy Research and Development	Cooperative "umbrella" agreement covering a wide range of energy technologies, including solar and geothermal resources, conversion of coal into gaseous and liquid forms, electrical transmission using superconduction and microwaves, energy conservation, use of waste materials and waste heat, storage of electrical energy in advanced batteries, and energy conversion technology using hydrogen, fuel cells and magnetohydrodynamics. Cooperation is expected to take the form of visits, meetings,

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
Japan (continued)		exchange of information and joint projects. Implementation will be by interagency protocols covering specific technologies under the "umbrella" agreement. Discussions are currently underway on agreements in solar, geothermal and battery R&D. Began 1974 for five years.
Japan	Nuclear Safety	Exchange of visits and documents on nuclear safety areas such as earthquake data, antiseismic design and analysis, fatigue and embrittlement of pressure vessel materials, phenomena following coolant-loss accidents, reactor kinetics, and strength of fuel-cladding materials. Began 1966, open ended.
Iceland	Geothermal	Exchange of documents and visits, and direct communication between specialists in the field of geothermal source energy utilization. Began 1973, for five years. Amended 1974 to include cooperation in the undertaking of joint projects.
Italy	Geothermal	Exchange of information, meetings and visits, and joint projects in research and development and demonstration of geothermal energy applications. Began 1975 for five years.
Italy	Desalting	Exchange of personnel and information on application of nuclear energy to the desalting of water. The Italians are interested in studying the feasibility of desalting plants in the south-eastern region of Italy. Began 1965, open ended.

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
Japan	Fast Breeder Reactor	Exchange of visits and documents concerning the development of civilian nuclear power plants using liquid metal cooled fast breeder reactors. Limited to base program work. Began 1969 for ten years. Discussions are underway for expanded cooperation.
Netherlands	Homogenous Reactors	Exchange of information in the field of homogenous slurry reactors and assignment of U.S. personnel to KEMA Laboratories. Began 1962, open ended.
Netherlands	Sodium Component Testing	Exchange of visits and documents concerning results of testing of components for use in sodium-cooled fast breeder reactor power plants. Began 1970, for four years. Extended through 1979.
New Zealand	Broad Scientific and Technical Cooperation	Cooperative Scientific and Technical agreement, with initial emphasis on energy research. New Zealand has shown a strong interest in the geothermal area. Began 1974 for five years.
Poland	Coal	Exchange of research scientists and research results, joint symposia and seminars on coal extraction and utilization, research and development programs. The Agreement incorporates an earlier US-Polish program in coal liquification, gasification and base metals. FY 1976 funds of $6.5 million in Zloty equivalent appropriate for cooperative work in construction and operation of coal liquification pilot plant and production of clean gas for MHD. Began 1974 for five years.

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
Romania	Peaceful Uses of Atomic Energy	Memorandum on Cooperation in the Peaceful Uses of Atomic Energy signed in 1968. Provides for exchange of scientific personnel and information, possibility of joint research projects. Became active 1971.
Spain	Nuclear Health and Safety	Biomedical research program focused on behavior of very low levels of plutonium oxide in rural agricultural environment near Palomares, Spain. Began 1966, extended annually.
United Kingdom	Coal	Exchange of personnel, equipment and information on coal reserves, extraction technology, conversion, transportation; and environmental, legal, economic, health and safety impacts of coal. Began 1974, open ended.
United Kingdom	Controlled Thermonuclear Research	Exchange of information relating to controlled thermonuclear fusion. Began 1958 as part of broader exchange, of which other areas were discontinued in 1972, open ended.
United Kingdom	Fast Reactors	Exchange of reports, specifications, visits and personnel dealing with fast reactors. Began 1965, ends July 1976. Discussions are underway to expand the cooperation.
USSR	Peaceful Uses of Atomic Energy	ERDA is the executive agent for the U.S. side under the 1973 US-USSR Agreement on Scientific and Technical Cooperation in the Peaceful Uses of Atomic Energy, which runs for ten years. This agreement provides for cooperation in three major areas:

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
USSR (con't)	Peaceful Uses of Atomic Energy	controlled thermonuclear research, fast breeder reactors, and fundamental properties of matter.
USSR	Controlled Thermonuclear Research	Aim is the eventual development of prototype and demonstration-scale thermonuclear reactors. Forms of cooperation include joint work, analyses and meetings, and assignment of personnel to each country's laboratories. Other types of cooperation may be added by mutual consent, but there is no provision for joint construction projects. One of the three areas covered in the 1973 Agreements listed above.
USSR	Fast Breeder Reactor	Cooperation is directed toward problems connected with design development, construction and operation of fast breeder reactors. Forms of cooperation include assignment of personnel to each country's laboratories research centers, universities and reactor test facilities. Joint work is envisioned, but there is no provision for joint construction. One of the three areas covered in the 1973 Agreement listed above.
USSR	Fundamental Properties of Matter	Program of joint research projects involving primarily proton accelerators at the Institute for High Energy Physics, Serpukhov, and the Fermi National Accelerator Laboratory, Batavia, Illinois. One of the three areas covered in the 1973 Agreement listed above.

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
USSR	Energy-General	ERDA is responsible for the research and development portion of the 1974 Energy Agreement between the US and USSR. The Federal Energy Administration is responsible for the information exchange portion. This Agreement covers joint programs in conventional and unconventional forms of energy, energy-related environmental topics, and conservation and demand restraint measures. To implement the Agreement, a Joint US-USSR Committee on Cooperation in the Field of Energy has been established. Cooperation includes exchange of information, forecasting methodology, technical specialists, joint research, planning, and conduct of programs. In addition, temporary groups of experts have been appointed by both sides to explore the feasibility of cooperation in the areas of oil, coal and gas technology. This effort involves a one-time exchange of experts in these fields to specific areas in which joint work can be undertaken. Open ended.
USSR	Electricity Transmission	Exchange of visits and assignment of personnel to each country's laboratories and research institutions in field of superconducting transmission Joint projects are provided for and are underway. One of the areas covered in the 1974 Energy Agreement listed above.

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COUNTRY	PRINCIPAL SUBJECT	DESCRIPTION
USSR	MHD (Magnetohydro-dynamics)	Exchange of visits and assignment of personnel to each country's laboratories and research institutions in field of magnetohydro-dynamics. Joint projects are provided for and are underway. One of the areas covered in the 1974 Energy Agreement listed above.
USSR	Thermal Power Plants	Exchange of personnel and joint conferences on design and operation of heat rejection systems for thermal power plants. One of the areas covered in the 1974 Energy Agreement listed above.
USSR	Solar	Exchange of personnel and joint conferences in field of solar energy. One of the areas covered in the 1974 Energy Agreement listed above.
USSR	Geothermal	Exchange of personnel and joint conferences in field of geothermal energy. One of the areas covered in the 1974 Energy Agreement listed above.

Attachment 3

AGREEMENTS FOR COOPERATION IN THE CIVIL USES OF ATOMIC ENERGY

A. Bilaterals with Individual Countries:

COUNTRY	SCOPE	EFFECTIVE DATE	TERMINATION DATE
Argentina	Research and Power	July 25, 1969	July 24, 1999
Australia	Research and Power	May 28, 1957	May 27, 1997
Austria	Research and Power	Jan. 24, 1970	Jan. 23, 2014
Brazil	Research and Power	Sept. 20, 1972	Sept. 19, 2002
Canada	Research and Power	July 21, 1955	July 13, 1980
China, Rep. of	Research and Power	June 22, 1972	June 21, 2014
Colombia	Research	March 29, 1963	March 28, 1977
Finland	Research and Power	July 7, 1970	July 6, 2000
*Greece	Research	August 4, 1955	Aug. 3, 1974
India	Power (Tarapur)	Oct. 25, 1963	Oct. 24, 1993
Indonesia	Research	Sept. 21, 1960	Sept. 20, 1980
Iran	Research	April 27, 1959	April 26, 1979
Ireland	Research	July 9, 1958	July 8, 1978
Israel	Research	July 12, 1955	April 11, 1977
Italy	Research and Power	April 15, 1958	April 14, 1978
Japan	Research and Power	July 10, 1968	July 9, 2003
Korea	Research and Power	March 19, 1973	March 18, 2014
Norway	Research and Power	June 8, 1967	June 7, 1997
Philippines	Research and Power	July 19, 1968	July 18, 1998
Portugal	Research and Power	June 26, 1974	June 25, 2014
South Africa	Research and Power	Aug. 22, 1957	Aug. 21, 2007
Spain	Research and Power	June 28, 1974	June 27, 2014
Sweden	Research and Power	Sept. 15, 1966	Sept. 14, 1996
Switzerland	Research and Power	Aug. 8, 1966	Aug. 7, 1996
Thailand	Research and Power	June 27, 1974	June 26, 2014
Turkey	Research	June 10, 1955	June 9, 1981
United Kingdom	Research and Power	July 21, 1955	July 20, 1976
United Kingdom	Power	July 15, 1966	July 14, 1976
Venezuela	Research and Power	Feb. 9, 1960	Feb. 8, 1980
Viet-Nam (Republic of)	Research	July 1, 1959	June 30, 1979

* A superseding research and power agreement is being held in abeyance: U.S. material is covered by IAEA (NPT) safeguards and Greek "peaceful uses" guarantee.

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B. Bilaterals with International Organizations:

ORGANIZATION	SCOPE	EFFECTIVE DATE	TERMINATION DATE
European Atomic Energy Community (EURATOM)	Joint Nuclear Power Program	Feb. 18, 1959	Dec. 31, 1985
EURATOM	Additional Agreement to Joint Nuclear Power Program	July 25, 1960	Dec. 31, 1995
International Atomic Energy Agency (IAEA)	Supply of Materials, etc.	Aug. 7, 1959	Aug. 6, 2014

Funding of the
International Energy Agency (IEA)

The IEA is funded on a calendar year basis. This funding is provided in two parts: Part I consists of funds from the Combined Energy Staff of the OECD; Part II consists of direct contributions to the IEA from member nations. The U.S. contribution in each instance has been 25% of the total, based on the US GNP as a portion of the GNP total for all IEA member nations. (The budgets for the IEA are normally stated in francs.)

Year	Part I (Francs)	Part II (Francs)	Total (Francs)	Total ($)	U.S. Contribution
CY 74	(start-up costs)		2.641.627	606,434	$ 151,608
CY 75	4.300.000	21.268.800	25.568.800	5,869,789	$1,467,447
CY 76	4.800.000	23.678.400	28.478.400	6,537,741	$1,634,435

DEVELOPING INTERNATIONAL AGREEMENTS

(From: A National Plan for Energy Research, Development, and Demonstration, ERDA, 1976)

The United States is not alone in dealing with the continuing problem of a secure and economical energy supply. Many countries in the world have the same problem but, in most instances, are not blessed with natural resources as abundant and diverse as those of the United States. Thus, they, too, have recognized the need for and value of effective conservation programs and the necessity of developing new technologies.

Because of the obvious economic benefits that would accrue, it is clearly in the best interests of all the nations who share the problem to cooperate in finding its solution. The U.S. policy is to promote such cooperation and interaction wherever appropriate.

To this end, ERDA, the Department of State, and other Federal agencies are fostering international research, development, and demonstration initiatives in many energy areas. Several courses of action are being pursued, including: (1) entering into bilateral R.D. & D. and nuclear supply agreements; (2) participating in the International Energy Agency (IEA); (3) providing assistance to developing countries; and (4) participating in the Safeguards Program.

ENTERING INTO BILATERAL AGREEMENTS

More than 30 bilateral agreements are in effect that permit technical data exchanges as well as the supply of nuclear reactors and uranium enrichment services.

Specific energy R.D. & D. agreements exist between the U.S. and the U.S.S.R., and between the United States and Japan. Specifically, the United States currently exchanges information on breeder reactors with Japan, and in the fields of fusion and breeder reactors with the U.S.S.R. A number of agreements in the nonnuclear area are pending with Japan. The United States has entered into separate agreements with Iceland and Italy in the geothermal field, and has agreements with Poland on coal research. Energy R.D. & D. cooperation also forms an important part of numerous other general science and technology agreements with other countries. Finally, the United States has recently executed memorandums of understanding (MOU's) with eight countries calling for information exchange on solar heating and cooling of buildings.

PARTICIPATING IN THE INTERNATIONAL ENERGY AGENCY

As a result of membership in the International Energy Agency (IEA), the United States is participating in a number of energy R.D. & D. programs. For example, active efforts have been underway during the past year to identify areas of interest for cooperation, to prepare a framework of principles governing joint support of energy R.D. & D. projects, and to draw up cooperative implementation agreements. In the coming year, work will proceed on producing an overall IEA strategy by the end of 1976.

In addition to these policy and administrative activities, the IEA has launched a number of specific, important energy technology R.D. & D. projects. Originally, nine areas were identified for multilateral cooperation: coal technology, nuclear reactor safety, radioactive waste management, controlled thermonuclear fusion, conservation R. & D., solar energy, hydrogen, municipal and industrial waste, and waste heat utilization. At special meetings on research and development on November 20–21, 1975, the IEA Governing Board recommended seven new areas: high temperature reactors for process heat, geothermal energy, solar power systems, wave power, wind energy, ocean thermal energy, and biomass conversion.

The IEA also approved an energy systems analysis effort, which will be a major activity in 1976, to identify and evaluate energy technology options, their potential energy contributions to the various member countries, and their commercial implementation time frame; and to advise the member nations individually and collectively on R.D. & D. priorities. This systems analysis work will be undertaken by national experts and by two international groups, one located at the Brookhaven National Laboratory in the United States and the other at the Julich Laboratory in Germany. In the course of these studies, data on energy and interfuel substitution possibilities will be collected and made available to all member nations.

Similarly, cooperative ventures among smaller groups of participating countries can be arranged under the auspices of the IEA. For example, in November 1975, the United States signed the five agreements as part of an overall IEA coal technology cooperative effort. One of these was an agreement among the United States, the Federal Republic of West Germany, and the United Kingdom to research more efficient and cleaner ways to burn coal. A fluidized bed combustion test facility, designed to burn coal more efficiently, will be built in Britain at a shared cost of $15–$20 million.

ASSISTING DEVELOPING COUNTRIES

The United States participates in a number of international, energy-related activities that involve developing countries. For example, there are U.S. Joint Cooperative Commissions with Israel, Iran, and Egypt that allow for assistance in nonnuclear programs.

On September 1, 1975, during the special meeting of the U.N. General Assembly, the United States proposed an International Energy Institute (IEI) to assist developing countries in applying available energy technology to their energy needs. This concept was welcomed by other members of the U.N. and is now in the process of being developed in more detail. In the nuclear area, the International Atomic Energy Agency (IAEA) provides an excellent forum for cooperation and mutual reward among developed and developing nations. Two notable programs in this format are the IAEA's technical assistance program and its Safeguard Program.

PARTICIPATING IN THE SAFEGUARDS PROGRAM

The International Atomic Energy Agency (IAEA) is responsible for the implementation of safeguards portions of the Nonproliferation Treaty relating to the peaceful uses of nuclear materials. In the

Safeguards Program, the United States and other countries supplying nuclear material, equipment, and technologies require assurances that: (a) exported nuclear material is not diverted by the receiving country for explosive use; (b) receiving facilities have adequate safeguards and physical protection against domestic nuclear threats; and (c) any nuclear assistance will not be used by the receiving country to further any military purpose.

ERDA, the Arms Control and Disarmament Agency (ACDA), and the Nuclear Regulatory Commission, NRC) assist the IAEA in developing effective safeguards procedures and improving measurement techniques. ERDA is responsible for reviewing facilities that receive U.S. nuclear materials to insure adequate physical protection before NRC grants the export license. These ongoing reviews have proved effective in encouraging adoption of these measures by other countries.

The International Aspects of ERDA's Plans and Programs

ISSUE

The ERDA Plan does not place sufficient emphasis on international considerations.

SUMMARY

ERDA's mission extends well beyond America's national borders. In the interdependent world of the 1970's and 1980's, energy independence, economic well-being and environmental quality (the essence of the five national energy goals) cannot be achieved without considering international factors. "Project Independence" with its go-it-alone implications for R, D&D (let alone for national energy policy in general) may well be inconsistent with requirements for developing new energy sources in cooperation or coordination with other countries, particularly in undertaking joint exploration and exploitation of nonnational resources (e.g., the oceans). Moreover, the current proliferation of nuclear facilities in the face of the Nonproliferation Treaty poses difficult technical as well as institutional problems of monitoring, inventories, and control. ERDA identifies these considerations in its Plan (volume I,) but barely recognizes them in its Programs (volume II).

COMPARATIVE SUMMARY

The revised ERDA Plan and Program places significantly more emphasis on international considerations. In each of the programs a section is devoted to international activities indicating an increased interest in solving energy problems on an international scale. Special note should be given to their program for an organized, systematic study of conservation in other industrial countries. Approaches will include identifying worldwide problem areas and evaluating alternatives for coping with them.

Moreover, the ERDA draft *Plan*, repeating ERDA 48, includes among its five assumed "National Policy Goals Related to Energy" the following:

1. Maintain the security and policy independence of the Nation. . .
2. Contribute to world stability through cooperative international efforts in the energy sphere.

In Chapter IV, "Implementing the Plan: Interrelationships Among Energy R, D&D Participants," a number of ongoing and proposed actions involving other nations and international agencies are discussed. ERDA groups this activity under the four "courses of action being proposed," as follows:

1. Entering into bilateral R, D&D and nuclear supply agreements.
2. Participating in the International Energy Agency (IEA).

3. Providing assistance to developing countries.
4. Participating in the Safeguards Program.

Problems remain, however, in ERDA's international program which may not permit optimum benefits from the program. The principal deficiencies in the discussion of international considerations are the following:

1. It combines proposed and existing actions.
2. It does not address the purposes of the actions noted.
3. It does not differentiate between ERDA's actions and the actions of other Federal agencies.
4. It gives far too sanguine a view of the capabilities of the International Atomic Energy Agency (IAEA).
5. There is no discussion of the apparent inconsistency and therefore balance required between the two goals cited above — independence and interdependence.
6. Small technology which would be of immense importance in underdeveloped countries is not mentioned.

QUESTIONS

1. How does ERDA's Assistant Administrator for International Affairs plan to approach such issues as energy independence; the need for international coordination of energy, economic, and environmental policy; the exploitation of nonnational energy sources; and the challenges of nuclear proliferation?
2. What has been the role of ERDA's oversea staff? Why should such a staff be concentrated in Brussels? Should not ERDA be in close liaison with the International Atomic Energy Agency, the International Institute for Applied Systems Analysis in Vienna, and the International Energy Agency in Paris?
3. What is the division of responsibility in the international energy area between ERDA, the Department of State, and other Federal agencies?
4. What plans or programs does ERDA contemplate for international research and development in the control and disposal of radioactive waste?
5. What role will ERDA play in aiding underdeveloped countries?

("Agenda Items for the Workshop on International Diffusion of Energy Technology", Center for International Studies, M.I.T. Energy Lab., June, 1976)

The principal objective of this workshop is to discuss and to clarify the several issues that arise from the interplay between government and American industry in the international exchange of new energy technologies.

On the following pages are brief statements of some of the specific issues that are of particular concern to industry. These were singled out after discussion with industrial representatives and will constitute a first cut at an agenda for the Workshop. We will not take them up necessarily in the order presented in this paper; in fact several overlap and cannot be fully separated. However, these issues are those we hope to be sure to cover. The agenda items have three organizing themes:

a.) The effects of policies and regulations of executive departments with responsibilities in the energy field in inhibiting or facilitiating technology and hardware transfers by American corporations;

b.) the role of the government's international energy policies, and its participation in cooperative programs with other countries, in stimulating, encouraging, or otherwise affecting domestic energy activities in the private and public sectors;

c.) the problems faced by the Federal Government, especially the Energy Research and Development Administration (ERDA), in its objective of acquiring technologies from abroad for use in the U.S.

I. Managing the International Component of U.S. Energy Research and Development Policy

The Administration has set as a prime national goal reducing the dependence on foreign energy resources to the point where the United States would not be vulnerable to external economic coercion. To achieve that end, federal programs have been inaugurated that are intended: a) to expedite the exploitation of all available domestic resources; b) to rationalize the development of these resources and to conserve their use; and, c) to encourage the development of new energy technologies. The last includes increased government interest in R&D projects and programs with other governments, particularly other members of the International Energy Agency (IEA); exploration of possible joint development programs with other nations; and design of programs to exchange potentially beneficial technical information.

Major responsibility for the international aspects of energy programs lies with the Office of The Assistant Administrator for International Affairs (AIA) of the Energy Research and Development Administration. The primary AIA mission is to establish relationships with other countries and international organizations that have potential for furthering the ERDA mission. In furtherance of this mission, AIA provides support to the ERDA operating divisions as they enter into international relationships of direct relevance to their missions, and is mandated to serve as the lead organization within the U.S. government on international policy matters that pertain to energy technology. AIA's second mission is to contribute to and support broader

national policies of the U.S. involving bilateral and global relationships. This mission implies a role in determining ERDA's policies, including directions for R&D, that reflects broader U.S. foreign policy interests. These two missions suggest the complementary, but not officially stated, responsibility to serve as the vehicle by which foreign policy considerations and knowledge about the R&D programs of other countries can be included in the formulation of domestic R&D strategy.

Obviously, responsibility for planning and implementing international aspects of American energy policy is not AIA's alone. The Department of State, the Department of Commerce, the Department of Defense, the Congress and sometimes the White House also play important parts. Many sectors of American industry and many individual firms are also directly involved in joint projects and are concerned about the overall orientation and direction of policy in this area.

Given the short time frame in which institutions have been created, old programs revamped and new programs initiated, we have not been surprised to learn that many officials in the energy industry perceive a lack of clarity and coordination in current programs. We hope that the workshop will, among other things, shed light on the existing arrangements, procedures and activities of the several responsible government agencies and on the organizational arrangements and constraints under which they operate.

Framed as questions, these issues can be stated as follows:

1. Is ERDA/AIA's present authority adequate to fulfill its

mandate? How does it interact with other interested and responsible agencies?

2. What are ERDA/AIA's priorities among its diverse goals as lead agency conducting technological exchanges with other countries? Do certain technologies have precedence? Are there preferred cross-national arrangements? What emphasis is placed on meeting the energy needs of allies or less developed countries?

3. Through what procedures and according to what criteria, is the technology obtained from abroad directed into domestic American commercial channels and/or government organizations for practical application? In particular:

a) How is the role of ERDA, and government laboratories generally, envisaged in the development and exploitation of technology from abroad (e.g., French Phoenix breeder reactor; Soviet advances in photo-voltaic technology; German work in conservation areas)?

b) What intra-governmental mechanisms for coordination exist for synchronizing the import of foreign technology with domestically focused R&D programs? with FEA planning? with the Justice Department's Anti-Trust Division? with the Commerce Department?

c) What is the place of government labs in the organization of the government effort? Where do energy R&D competences lie? What are the most productive links that can be made by public facilities with industries (or universities)?

What are their potential for industrial application (e.g., uranium enrichment technologies, geothermal, batteries)?

II. The Acquisition of Foreign Technology: The U.S. Bargaining Position, the Problem of Information Dissemination, and the Role of Private Industry

It has been argued that the United States government operates under a considerable handicap in bargaining with foreign governments (as in the IEA) for exchange of energy technologies. Simply put, the legal obligation of government agencies to place in the public domain technical information to which they hold title, or have otherwise acquired access weakens the leverage of American officials seeking to arrange a quid pro quo exchange.

ERDA must observe set procedures, specified in its contracts, that "Scientific and technical information developed in work supported by AEC (ERDA) or conducted in AEC (ERDA) facilities, including reimbursable work done for other agencies and private industry, shall be reported promptly and fully to the AEC (ERDA) included in the AEC central information data base, and, as security, patent and other AEC (ERDA) policy considerations permit, be made available to the scientific, technical, and industrial communities, and to the public, through approved channels." (AEC Manual, Chapter 3201, Reporting and Disseminating Technical Information, paragraph 01) That information is routinely made available through ERDA's Technical Information Center at Oak Ridge, the National Technical Information Service and government

laboratories. Some types of information are distributed through the IEA or the International Atomic Energy Agency (IAEA) and to the 32 governments with which the U.S. government now has bilateral technical exchange agreements. The Freedom of Information Act (FOIA) stipulates that government departments "shall make records [viz. data and information] promptly available to any person" upon request (U.S. Code, Title 5, section 552 (a) (3)). Court decisions have been interpreted as defining 'any person' to include foreign nationals, where classified data is not at issue.

The Federal Non-Nuclear Energy Research and Development Act of 1974 included a somewhat ambiguous provision which, read in the light of the FOIA, seemed to require that ERDA disclose all discoveries resulting from ERDA funded or managed R&D programs. Under certain circumstances, that obligation applied as well to background information brought to an ERDA project by participating private companies. As amended in 1975, the operative section (42-U.S. - C5916 Section 17), now appears to give the administrator wider discretionary powers to protect trade secrets and proprietary information (see Appendix A).

There are also exceptions to the blanket disclosure rule of the FOIA. Two significant ones are: matters "specifically required by Executive Order to be kept secret in the interest of the national defense or foreign policy" and "trade secrets and commercial or financial information obtained from a person and privileged or confidential." (U.S. Code, Title 5, section 552 (6)) The application and practical meaning of the latter exclusion is not fully clear.

The implications of these disclosure requirements for ERDA's

ability to bargain with other countries and for American or foreign industry's willingness to become party to joint ventures are not certain. The general feeling within ERDA is that the effect of the regulations is to leave little to trade for technology or data from other countries and to provide a strong disincentive for American and foreign firms who might otherwise be more willing to enter into joint projects with ERDA.

ERDA's bargaining position may be further weakened by the outward flow along purely commercial channels of new, privately developed technical information and hardware, and by government regulations and practices pertaining to patent acquisition and entitlement to proprietary information. The latter entail matters of law, administrative practice and corporate structure and marketing. Any discussion of this singularly complex topic should be prefaced by recognition of the lack of uniform procedures among executive departments, the ambiguities of overall government policy, and the multitude of qualifications and amendments appended to existing regulations.

Two key questions must be addressed:

1. Is the current policy of relatively liberal dissemination of technical information detrimental to overall American interests or are there countervailing advantages, such as assisting American allies to reduce their own dependency on OPEC oil or facilitating R&D by American industry, that compensate for the difficulties?

2. Are there reasonable changes in the laws and regulations now governing release of proprietary information that can meet the problems raised by obligatory disclosure without jeopardizing any advantages of the present policy?

In light of the problems the government has in bargaining with other countries (and for other reasons as well), some industry representatives argue that private firms, acting through normal, unrestricted commercial channels could do a better job of acquiring usable and useful new technologies than can the U.S. government. This position has been taken particularly by those who urge the licensing of the French Phoenix breeder reactor, and by those interested in some types of automative technology and storage batteries. It is pertinent to explore:

1. the correctness or incorrectness of this view;

2. whether, if correct, it would hold in those instances where the technology in question is in the possession of a foreign government or government-owned corporation as opposed to private industry;

3. to what extent this position reflects a desire to create conditions favorable to sales of complementary technology by American companies;

4. whether there are political goals that would require for their realization the acquisition of information and hardware by the U.S. government rather than by private companies. Such political goals might include strengthening the I.E.A., having a strong bargaining position vis-a-vis OPEC, or the U.S. government playing an active entrepreneurial role role in domestic projects to commercialize new energy technology.

III. Foreign Participation in ERDA R&D Projects

ERDA's legislated mandate calls upon the agency to enter into joint programs with foreign firms (and government facilities) where there is judged to be some possible benefit to the American national energy program. On the whole, American companies appear to look with equanimity on these ties. A number of practical issues as to fair competition and preferential advantages have arisen however.

A. Patent and License Policy

It has been suggested that in certain instances (e.g., the ERDA contract with a French organization working on solar boilers) ERDA has been prevailed upon to grant patent rights to the foreign firm on terms more liberal than those generally extended to American firms. There is also some worry that a foreign firm will use its own organization to market the resulting technology in the U.S., squeezing out American companies. There is the reverse situation when a U.S. company collaborates with a foreign firm on an ERDA sponsored project, as under a bilateral IEA arrangement. In one instance, ERDA's policy on patent disclosure produced such a strong disincentive for the German subcontractor as to put the project in jeopardy. (For a more complete discussion of government patent policy, see Appendix B.)

A somewhat different question arises with regard to a consortium arrangement that might be made between an American and foreign company to exploit commercially a technology developed solely by the American partner with ERDA support. Does the government's retention of a non-exclusive license give it some leverage over subsequent transfers and uses abroad by foreign firms?

B. Anti-Trust Constraints

Considerable attention has been paid by both government and industry to the bearing that existing anti-trust legislation could have on transnational R&D consortia.[1] Various legal arrangments have

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[1] Institutional and Legal Constraints to Cooperative Energy Research & Development, Industrial Research Institute, Inc. Prepared for the Commerce Technical Advisory Board.

been worked out to permit cooperative efforts in the R&D field, but the administrative costs of winning disposition are at times viewed as onerous, and are a major handicap to launching new ventures in some sectors. In Justice Department eyes, the responsibility falls on the companies involved to make a persuasive case that the potential dangers residing in an R&D oligopoly should be overridden.[2] An outstanding example is the Inter-Industry Emission Control program planned by the Ford Motor Company along with three Japanese auto manufacturers and five U.S. oil companies. One pertinent issue here is whether government-to-government discussions might not expedite the process of obtaining Justice Department waivers. A second is the significance of the asymmetries between government-industry ties in the U.S. and those that prevail in some other countries.

IV. International Competition

A number of companies have pointed out that, in several respects, U.S. government regulations place them at a competitive disadvantage against foreign firms with whom they compete in exploiting commercially viable new energy technologies. In some nations, e.g. Japan, government overtly encouraged R&D consortia (as in the automotive field), contrary to the American practice. In some energy areas,

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[2] Ibid, p. 39.

e.g. nuclear power in France and Germany, foreign governments appoint one company as a 'commercial agent' to develop a specified technology and provide financial backing to that company. This not only prevents duplication of effort, but also puts the single government-backed firm in a strong position to compete with American firms in the world market.

Comparatively rigid safety and environmental regulations in the U.S. are seen as a hindrance in some fields, in particular nuclear power and automobile engine design. Designs and manufacturing practice required by American regulations are seen by some as reducing the competitiveness of the resulting product in international commerce.

Similarly, inconsistent and occasionally contradictory government policies are often viewed as an impediment to corporate efforts to design and develop new energy technologies; and uncertainty about future government policies can be a major disincentive to innovation.

The attractiveness of foreign countries for investment by American firms varies greatly from country to country. The general diplomatic climate, the availability of loans from the Export-Import Bank and U.S. tax policy with respect to foreign investment and foreign research and development are important factors. American commerical attaches can be of significant assistance to American companies operating abroad. Firms tend to see definite advantage from official representatives who can: 1) help to establish company bona fides, and to overcome the problems of cultural distance (especially in the "third world") and 2) provide information about practices and personalities among responsible foreign government officials. It is an

open question as to whether, and to what degree, more direct involvement by U.S. government officials in commercial matters becomes a hindrance rather than a help.

V. Nuclear Power

A distinguishing, indeed unique, feature of this field is that nuclear energy technology was fostered, and largely developed in its early stages directly by the federal government. The constant interest in nuclear weapons and naval propulsion systems, and the continuing commerical role of the government in supplying nuclear fuels, assures that government continues to have the dominant voice on all matters nuclear.

We can identify three sets of issues about the government-industry interchange on commercial development and transfers of nuclear technology. The first deals with the participation of private companies, acting in conjunction withthe U.S. government or independently, to develop and commercially operate facilities for producing nuclear fuels. Government policy until recently has been to maintain a public monopoly. Two considerations appear to have dictated public ownership of uranium enrichment and plutonium reprocessing plants: above all, the desire to control the output of all weapons grade nuclear material (and, therefore, the capacity to produce it) so as to avoid unregulated transfers abroad; and to obtain leverage over the activities of other countries in the nuclear field by centralizing the source of fuels for

civilian power generating plants under American government control.

Some of the skeptical questions asked by the private nuclear power industry about the policies that flow from this attitude can be summarized as follows:

1. Has the U.S. prohibition on the export of enrichment and reprocessing technology, in fact, inspired independent developments elsewhere that result in a loss of control over nuclear fuel sources?

2. Is the U.S. technological advantage so great that efforts to prevent transfer of nuclear technology by private companies are worth the commercial (and potentially political) cost?

3. To what extent is the current shortage of enrichment capacity (with the consequent incentive for other countries to enter the international market for enrichment services) attributable to earlier AEC discouragement of centrifuge technology? What was the interplay of political and commercial considerations in those decisions?

4. What regulations pertain with regard to the financial investment of foreign governments in privately built plants in the U.S. for uranium enrichment and plutonium reprocessing in exchange for guaranteed deliveries? What role is foreseen for private industry in multinational or international fuel cycle facilities?

The second set of issues of government-industry relations in the nuclear area concerns the participation of American firms in joint nuclear ventures with foreign firms. How has the change in government's attitude over the past four years toward possible collaboration with the Europeans and Japanese on joint construction of

gaseous diffusion and reprocessing plants affected the American nuclear industry? What are the technological and political implications of a government policy that denies American companies licenses to join in the development of innovative isotope separation projects (e.g., Bechtel's proposed involvement in the German jet nozzle program)? Are these policies motivated mainly by concern over the spread of technology that has possibly dangerous military implications and/or a desire to maintain a U.S. commercial advantage?

The third set of issues deals with sales of nuclear power generating reactors, the main arena in which political and commerical forces confront each other. The principal questions of central interest to both government and industry appear to be the following:

1. Is it feasible to find agreed guidelines among supplier nations to regulate export of nuclear facilities so as to avoid competition that tends to dilute controls? Is cartelization of markets a desirable approach?

2. Would clear guidelines set by the U.S. government facilitate commerce by standardizing export regulations and expediting handling of licenses?

3. Is there adequate communication and agreed purpose, among the responsible agencies of government and between government and industry in monitoring and regulating the dissemination of nuclear technology? What complications for commercial enterprise might have resulted from upgraded standards on safety and reprocessing?

4. How might the U.S. government reconcile its undertakings as

a signatory of the Non-Proliferation Treaty to make available nuclear technology for peaceful purposes while moving to prevent its military applications?

5. What responsibilities does the private nuclear industry have to assure that nuclear facilities and fuels transferred along commercial channels are used exclusively for peaceful purposes?

VI. East-West Technology Transfers

The sale or other transfer of advanced energy technologies to the USSR, and the Eastern bloc countries, has become a contentious and troubling issue. In conflict are the goals of U.S. foreign policy with respect to the Soviet Union and other Warsaw Pact countries, the increasing political importance of energy and the means for its exploitation, and the sharpening competition among supplier countries. Main responsibility for monitoring and regulating exports to non-friendly nations (and friendly ones as well) lies with the Commerce Department's Office of Export Administration. The Office of Export Administration was established to administer the Export Administration Act (last revised in 1969), and is located in the Department's Office of East-West Trade. It presumably takes the lead in formulating, and applying the Commodity Control List (Cocom) that systematically catalogues commercial items according to sensitivity, and similarly classifies possible recipient countries. In composing and administering the list, Commerce is advised by an interdepartmental Tech-

nical Advisory Committee (including representatives from DOD, State, ERDA, and NRC). General responsibility for overseeing exchanges in the energy field, until recently, lay with the Inter-Agency Committee on International Energy R&D, whose responsibilities since have been assumed by ERDA-AIA. (Department of Commerce regulations on East-West trade are also normally coordinated with a NATO committee.)

Recent experience of both industry and government (e.g., proposed transactions with Iran) suggests that a careful review of present standards and procedures is in order. Among the relevant questions are the following:

1. According to what criteria is a particular nation given a Country Group designation?

2. According to what criteria is technology classified?

3. What are prevailing guidelines on exports of advanced energy techniques to the Soviet Union? Are they clear and consistent?

4. What means exist or might be proposed for enlisting industry participation in drawing up guidelines and cooperation in their application?

5. Are present modes of interdepartmental coordination satisfactory?

6. What problems are posed for export industries by Commerce Department regulations for licensing export of non-critical technologies, and data to friendly countries? by provisions seeking guarantees on re-export?

VII. Government/Industry Relationships

A. What, today, are the chief obstacles to fruitful consultation between industry and government?

B. What are the causes of poor communication:

- differences in the terms of political and commerical reference? in objectives?
- time perspectives?
- differences of professional training and institutional role?

C. Are elements of an adversary relationship unavoidable? Might they be necessary and useful? if so, when?

D. To what extent do the government imposed impediments to business, as seen by industry, derive from a lack of clarity in government objectives and uncertain authority for meeting them?

E. What are the problems of financing large-scale energy projects and what modes of government-industry cooperation are envisaged?

F. To what extent does Congress' role in energy policy complicate or support industry's objectives?

G. Are there specific measures that would improve industry/government interaction in international aspects of the diffusion of energy technology?

APPENDIX A

Federal Non-Nuclear Energy Research and Development Act, Amended
(42 - U.S. - C5916 Section 17)

"The Administrator shall promptly establish, develop, acquire, and maintain a central source of information on all energy resources and technology ... The information maintained by the Administrator shall be made available to the public ... in a manner that shall facilitate its dissemination provided that upon a showing satisfactory to the Administrator by any person that any information or portion thereof obtained under this section by the Administrator, directly or indirectly, from such person would if made public divulge (1) trade secrets or (2) other proprietary information of such person, the Administrator shall not disclose such information ... provided further that the Administrator shall, upon request, provide such information to (A) any delegate for the purpose of carrying out this Act ...; but such agencies and agency heads shall not release such information to the public."

APPENDIX B

Patents and Proprietary Information

The diversity of prevailing regulations in government is outstanding: DOD has traditionally pursued a generous policy of granting waivers or limited exclusive licenses while retaining royalty-free licenses for governmental purposes. NASA policies appear to have been on the whole more restrictive. AEC practice leaned toward government retention of exclusive licenses, and as a matter of policy decision, made meager use of its waiver authority. A 1970 amendment to the Clean Air Act calls for mandatory licensing. There are as yet no clear conclusions to be drawn as the approach most suitable to ERDA.[1]

Current patent policies affecting programs under the Federal Non-Nuclear Energy Research and Development Act are seen in industry, government offices alike as unclear, and resistant to easy interpretation. Some corporate contractors find that attitudes vary among ERDA program officers, contract officers, the General Counsel's office, and central policy (which is liberal on the question of waivers) seemingly derives from two sources.[2]

The unresolved philosophical conflict within the U.S. political system (is) between the 'goal of exclusivity' vs. 'the goal of full exploitation.' Presidential Statements on Patent Policy in 1963 and 1971 both failed to resolve the strain between principles of 'fair advantage' and 'public good' or to set a clear line of policy.

Section 9 (c) of the ERDA's enabling legislation calls for "making benefits of research, development and demonstration programs available to the public in the shortest time practicable," an injunction keyed to the goal of"promoting the utilization of invention, encouraging participation and fostering competition." Those statutory requirements which require that title to patents be vested in ERDA to provide "the authority to waive entitlements rights where appropriate." [3]

Outstanding issues raised by this legislation are:

A. the need to make uniform patent licensing provisions, and waiver guidelines of the AEA, and the Federal Non-Nuclear Energy Research and Development Act -- from which ERDA derives its legal mandate.

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1. "The Patent Policies Affecting ERDA Energy Programs." ERDA 76-16, January 1976, p.2-
2. Ibid., p. 28. 3. Ibid., p. 1.

B. the streamlining of waiver procedures on background proprietary information that industry feels are unduly complicated, and dilatory in processing -- procedures that seem to be a reflection of the ultra-cautious attitudes characteristic of the now-superseded AEC.

C. clarifying standards for utlizing existing discretionary authority to waive all or any portion of the U.S. rights to patents.

D. how government applies established criteria for defining conditions that according to administrative regulation, permit the grant of advance waivers on patents.[1]

-cost sharing arrangements
-on-going private R&D
-private use of ERDA facilities at full cost reimbursement
-"a manifest need" [2]

E. what is the practical significance of the December, 1975 amendment that tightens disclosure requirements on ERDA sponsored R&D projects?

Attitudes of private firms on disclosure of technical information, and terms for granting patent rights in many respects parallel the concerns voiced by government officials. Anxiety has been voiced about the possible disclosure of proprietary information developed by private firms in joint undertakings with the government, or the release of background information brought into joint projects. The saliency of this problem for a given company, in a particular circumstance, and the inhibitions it instills about joining in ERDA sponsored programs, varies markedly. Some of the factors that seem to weigh in the calculation are:

1. the quantity and importance of the technical information brought into the venture;

2. are patent rights or proprietary information at stake?

3. expectations as to the government position on the granting of preferential licenses and the protection of proprietary data;

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1. Ibid., p. 6.
2. Ibid., p. 99.

4. how long is the half-life preferential commercial exploitation of the technology in question;

5. the nature of the technology: are there marketing and organizational advantages, complementary software skills, that favor advantageous exploitation even under non-exclusive or limited exclusive conditions;

6. is the technical in question intended to be marketed or applied to follow-on industrial processes?

CCMS SOLAR ENERGY PILOT STUDY

SOLAR HEATING AND COOLING SYSTEMS IN BUILDINGS

REPORT TO THE CCMS SPRING PLENARY

April 8-9, 1975
Brussels, Belgium

prepared by the

Energy Research and Development Administration, USA

CCMS SOLAR ENERGY PILOT STUDY

REPORT TO THE CCMS SPRING PLENARY

INTRODUCTION

In October, 1974, representatives from seventeen countries met in Odeillo, France, to discuss the CCMS Solar Energy Pilot Study entitled SOLAR HEATING AND COOLING SYSTEMS IN BUILDINGS (SHCSB). In the six months following that meeting, significant steps have been taken to organize and begin the exchange of information on the SHCSB projects now underway and planned in the participating countries. This report describes the progress that has been made from October 1974 to April 1975.

The CCMS Solar Energy Pilot Study is piloted by the United States Energy Research and Development Administration (ERDA). ERDA is a new agency of the United States Government formed to consolidate all of the United States' energy research and development programs. Mr. Ray Fields is the Pilot Study Director. Program support is being provided by Dr. Frederick Morse of the University of Maryland. Dr. Morse is developing an information handling system to facilitate the distribution of the special reports and other information between the participating countries and planning the annual meeting of the CCMS Solar Energy Pilot Study.

SIGNIFICANT ACCOMPLISHMENTS

- The Memorandum of Understanding (MOU) has been reviewed by a number of the countries participating at the Odeillo Solar Energy Experts Meeting. Their comments have been received and incorporated into the MOU, which will be sent to national capitals for signature in the immediate future.

- A number of countries have already indicated their intention to sign the MOU when it is circulated for signature.

- The "Report on the Odeillo Solar Energy Experts Meeting," prepared by the U.S. National Science Foundation, has been sent to the participating countries. Executive Summary Reports for three Phase Zero Solar Heating and Cooling Studies in the United States have also been distributed by the U.S. National Science Foundation to the contact persons.

- The Zero Energy House Project Group, which was formed at the Odeillo Solar Energy Experts Meeting, held its first meeting in January, 1975, at the Technical University of Denmark, Copenhagen.

- Members of the Format Committee submitted their evaluations for the revision of the Project Reporting Format. These revisions were discussed by the Format Committee in January, 1975. A revised format will be made available shortly.

FUTURE EVENTS

- The 1975 Palo Alto CCMS Solar Energy Experts Meeting will be held in California from August 4-7, 1975.

- The Zero Energy House Project Group will meet in May, 1975, at the Philips Research Laboratory, Aachen, West Germany.

- The U.S. will distribute one or more Special Format Reports shortly after the August meeting.

- Arrangements are currently underway to obtain reports on seven major U.S. solar energy projects for distribution to the contact persons.

MEMORANDUM OF UNDERSTANDING

The Memorandum of Understanding Concerning Cooperative Information Exchange Relating to the Development of Solar Heating and Cooling Systems in Buildings which was drafted at the 1974 Odeillo Solar Energy Experts Meeting has been circulated to the designated agencies and governments of the participating countries. Some minor changes have been suggested and incorporated. Within the United States, the MOU has been circulated to the National Science Foundation, the Energy Research and Development Administration, and the Department of State.

The Memorandum of Understanding will be sent in the immediate future to national capitals for signature. The following governments have already indicated their intention to sign:

Australia
Belgium
Canada
Denmark
Federal Republic of Germany
France
United Kingdom
United States of America

Several countries which did not send representatives to the 1974 Odeillo Solar Energy Experts Meeting have expressed interest in the CCMS Solar Energy Pilot Study. The countries are: The Bahamas, Costa Rica, El Salvador, India, and Portugal.

PROJECT REPORTING FORMAT COMMITTEE

Members of the Project Reporting Format Committee, which was formed at the Odeillo meeting, have made progress towards the development of an effective format that would serve to provide standardized information on the performance of a sub-system or system. The international use of such a Project Reporting Format would enable a country to better assess the usefulness of the results of another project to its own solar heating and cooling systems in buildings program. Each member of the Format Committee agreed to test the draft Odeillo format by using it to describe one or two completed projects in their own country.

During December 1974 and January 1975, the Chairman of the Project Reporting Format Committee (Dr. Frederick H. Morse, USA) received either revised draft formats or detailed reports on the performance of a solar system or sub-system using the draft format from:

Mr. T. Esbensen, Denmark
Dr. H. Hörster, Federal Republic of Germany
Mr. J. F. Robert, France
Prof. A. Spyridinos, Greece

Each member of the Format Committee has received a copy of each of these reviews.

On January 30, 1975, those members of the Format Committee who were attending a meeting of the Zero Energy House Project Group, along with several observers, met to review the format and to discuss suggested

changes resulting from their attempts to apply it. The suggestions arising out of that meeting and the various reviews already submitted will now be incorporated into a Revised Format by the Chairman of the Format Committee. This task should be completed within several weeks and each member of the Format Committee will receive a copy for comment. After a reasonable time, the Chairman will use these comments to finalize the Format and submit it to the participating countries through the permanent contact persons for adoption and use.

Members of the Format Committee have also received copies of the U.S. National Bureau of Standards "Method of Testing for Rating Thermal Storage Devices Based on Thermal Performance" and "Method of Testing for Rating Solar Collectors Based on Thermal Performance."

The members of the Project Reporting Format Committee are listed in Table 1.

ZERO ENERGY HOUSE PROJECTS GROUP

Projects are underway in several of the countries present at the 1974 Odeillo Solar Energy Experts Meeting in which solar energy will be used to meet the significantly reduced energy needs of buildings incorporating various thermal energy conservation sub-systems, such as improved wall insulation, windows having reduced heat losses, waste water and exchange air energy recovery heat exchangers, and thermal energy storage. The objective of these projects is to study the performance of buildings requiring essentially zero energy from conventional fuels.

The Zero Energy House Project Group, which was formed at the Odeillo Meeting among those participating countries which are working with zero energy housing under northern European climatic conditions, held its first meeting during January 30-31, 1975, when fifteen representatives from six countries met at the Technical University of Denmark in Copenhagen (see Table 2 for the list of participants).* The objectives of the meeting were:

- o to review the present projects related to energy conservation and solar heating systems in buildings in each of the represented countries;
- o to discuss principles for energy conservation, measurement and instrumentation methods, performance of solar collectors and accumulating systems; and
- o to visit the "Zero Energy House" under construction at the Technical University of Denmark.

The program of the two-day meeting follows in this report.

Summary of "Zero Energy House" Projects of Represented Countries:

DENMARK

An experimental house (120 m^2 floor area) called the "Zero Energy House" is under construction at the Technical University. The measurements are planned to start in Spring 1975. The solar heating system of the house is dimensioned to cover the heat load for the house, 2300 kWh, and the hot water supply of 2700 kWh, during a whole year

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* The report on the Copenhagen Zero Energy House Experts Meeting was prepared by Professor Vagn Korsgaard, who chaired the meeting, and Mr. Torben Esbensen, both of the Thermal Insulation Laboratory, Technical University of Denmark.

with weather data corresponding to the "Reference Year." The Reference Year was constructed by scanning ten years' data of seven major and five minor measurements and locating the year with the least extremums in each of the major measurements (such as dry bulb temperature, moisture, etc.). The system consists of a vertical flat-plate solar collector of 42 m^2, a water storage tank of 30 m^3 and a combined ventilation and warm air heating system. Heat recovery is applied on the ventilating air and water. A windmill will eventually be installed to make the house totally self-sufficient with respect to its energy needs.

FEDERAL REPUBLIC OF GERMANY

At the Philips Research Laboratory in Aachen, a solar heated experimental house is under construction. High-insulated construction and heat recovery equipment reduce the heat load for the house to 8300 kWh a year. Specially designed 20 m^2 flat-plate solar collectors (45 degrees of inclination) combined with 40 m^3 water storage tanks are able to cover the total heat requirement for the 120 m^2 experimental house.

THE NETHERLANDS

Solar energy for space heating and hot water supply is used in an experimental house at the Eindhoven University of Technology. The total heat requirement for space heating and for hot water supply is calculated to 18,000 kWh, resp. 3000 kWh, in a normal year. The solar heating system is dimensioned to cover 60% of the heat requirement. The size of the water storage tank has been chosen to satisfy the heat requirement for two days.

SWEDEN

The Royal Institute of Technology in Stockholm has started a solar energy research project with the objective of developing high-efficiency flat-plate solar collectors and heat storage systems. The final plans are to design complete solar heating systems for houses.

UNITED KINGDOM

An "Autonomous House Research Programme" is underway at the University of Cambridge, Department of Architecture. The integration of the autonomous systems consists of solar radiation (for space heating and hot water supply), wind power (for electricity), digester gas (for cooking), and solar distillation of rain-water (for water supply). Computer programmes are being developed for optimizing the details of the autonomous integration.

At the Building Research Station in Watford, studies are being undertaken in the design of three to four low-energy-houses. These houses are planned to use solar radiation, wind power, heat pumps, and heat recovery systems.

NEXT MEETING

In response to the kind invitation from the German representative, Aachen, FRG, was selected as the site of the next Zero Energy House Experts Meeting during the last week in May, 1975. Dr. H. Hörster will handle the arrangements for the next meeting. Perhaps it will be possible during the meeting to visit both the Philips experimental house in Aachen and the Dutch experimental house in Eindhoven.

PROGRAMME

Meeting of the
Expert Group on the Zero Energy House

January 30, 1975

13.00-17.00: Start of meeting. Introductory remarks.

Principles for energy conservation in Zero Energy Houses.

Methods of calculation for energy conservation and solar energy systems.

January 31, 1975

9.00-12.00: Performance of solar collectors.

Performance of accumulating systems.

Measurement and instrumentation methods.

12.00-13.30: LUNCH

13.30-16.30: Presentation of the "Zero Energy House" and the laboratory facilities.

Discussion about future meetings.

16.30: End of the meeting.

MEETING PLACE: Thermal Insulation Laboratory
Technical University of Denmark
Building 118, 2nd Floor
Lundtoftevej 100,
2800 Lyngby
DENMARK

PERMANENT CONTACT PERSONS

Each country participating in the Odeillo Solar Energy Experts Meeting in October, 1974, identified a temporary contact person. In February, 1975, the participating countries were requested to indicate the name and address of their permanent contact person. Each participating country will receive a copy of this list when it is completed. All CCMS Pilot Study information will be sent to the permanent contact persons in duplicate. A list of the permanent and temporary contact persons can be found in Table 3.

Several other countries have requested and received CCMS Solar Energy Pilot Study information. The contact persons for those countries are listed in Table 4.

REPORTS DISTRIBUTED

As part of the information exchange of the CCMS Solar Energy Pilot Study, the U.S. National Science Foundation sent a copy of the Executive Summary reports for three Phase Zero Solar Heating and Cooling Studies to the contact person of each country participating at the 1974 Odeillo Solar Energy Experts Meeting. In addition, two copies of the "Report on the Odeillo Solar Energy Experts Meeting" prepared by the National Science Foundation were sent to each contact person. Arrangements are presently underway to obtain eight additional U.S. reports for distribution to the contact persons. A summary of these mailings can be found in Table 5.

SECOND CCMS SOLAR ENERGY EXPERTS MEETING

Plans are presently being made for the second CCMS Solar Energy Experts Meeting. At the 1974 CCMS Odeillo Solar Energy Experts Meeting, it was agreed that the next annual meeting should be held in conjunction with the 1975 International Solar Energy Society Congress in Los Angeles, July 28 to August 1. A flyer describing the ISES Congress was sent to the contact persons of all countries participating in the CCMS Solar Energy Pilot Study. Since the ISES Congress will concentrate on the technical aspects of the entire solar energy field and thus compliment the CCMS meeting, participants of the CCMS meeting are encouraged to attend the ISES Congress.

The second CCMS Solar Energy Experts Meeting has been scheduled for August 4-6, 1975, in Palo Alto, California (about 50 km south of San Francisco and a convenient 45 minute flight from Los Angeles). Tours of solar energy projects in the vicinity of the meeting are also being planned. The contact persons will receive detailed meeting information shortly. The CCMS representatives at the University of Maryland are coordinating the arrangements for the meeting. Inquiries regarding the meeting should be addressed to Mr. Ray Fields, Solar Division, U.S. Energy Research and Development Administration, Washington, D.C. 20545, USA.

Since the CCMS Solar Energy Pilot Study is open to all interested countries, foreign governments not currently participating in the program are encouraged to consider designating the individuals from their

countries who will be attending the ISES Congress in Los Angeles as official observers to the CCMS Solar Energy Experts Meeting. Countries interested in sending these observers to the 1975 Palo Alto CCMS Solar Energy Experts Meeting are requested to contact Mr. Ray Fields so appropriate arrangements can be made.

The draft agenda which has been prepared for the 1975 CCMS Solar Energy Experts Meeting follows in this report. Mr. Ray Fields has sent invitations to the contact persons of each participating country. The U.S. Department of State will handle the invitations to countries not represented at the 1974 Odeillo CCMS Solar Energy Experts Meeting. At the meeting, all participating countries will be prepared to give a brief summary of the present status of their country's solar heating and cooling systems in buildings (SHCSB) projects and programs. They are also requested to prepare a presentation on any projects for which a special Format Report will be prepared in the next year. Countries intending to make a presentation at the CCMS Solar Energy Experts Meeting were requested to bring a summary of their presentation(s) to the meeting. A report will be issued on the 1975 Palo Alto CCMS Solar Energy Experts Meeting.

PRELIMINARY AGENDA

CCMS SOLAR ENERGY PILOT STUDY

SOLAR HEATING AND COOLING IN BUILDINGS

August 4-6, 1975
Palo Alto, California

SUNDAY, AUGUST 3

Evening	Registration and Reception

MONDAY, AUGUST 4

A.M. Session	Introductory Remarks
	Objectives of Meeting (Morse)
	Report on Activities of Previous Year (Fields)
	Status of MOU (Harris)
Chairman:	*Mr. Ray Fields, ERDA, USA*
P.M. Session	Format Committee Report (Morse)
	Zero Energy House Project Report (Korsgaard)
	Update of Solar Heating and Cooling in Buildings Programs of Participating Countries
Chairman:	*Dr. F. Trombe, CNRS, France*
Evening	BANQUET

TUESDAY, AUGUST 5

A.M. *Session* — Continuation of Update of Solar Heating and Cooling in Buildings Programs of Participating Countries

Chairman: *Dr. V. Korsgaard, TUD, Denmark*

LUNCH and Tour of the Santa Clara Solar Heated Community Center Building

P.M. *Session* — Status Reports on Projects for Which Special Reports will be Prepared During the Forthcoming Year

Chairman: *Dr. F.H. Morse, UMD, USA*

WEDNESDAY, AUGUST 6

A.M. *Session* — Continuation of Status Reports on Projects for Which Special Reports will be Prepared During the Forthcoming Year

Chairman:

P.M. *Session* — New Business
- New Subgroups
- Next Meeting Date
- IEA/CCMS Relationship
- General Discussion
- Discussion of Proposed Annex A

Chairman: *Mr. Ray Fields, ERDA, USA*

COCKTAILS

A.M. Session: *9:30 - 12:30*

P.M. Session: *14:30 - 18:00*

CLARIFICATION OF RELATIONSHIPS BETWEEN U.S. AGENCIES

With the recent formation of the new U.S. Energy Research and Development Administration, it my be useful to clarify the relationship between certain agencies collaborating on the CCMS Solar Energy Pilot Study in the United States, the pilot country for this project. Administration of the CCMS Solar Energy Pilot Study now falls under the jurisdiction of the newly formed Energy Research and Development Administration (ERDA). ERDA is composed of parts of seven federal agencies, including the Atomic Energy Commission, the National Science Foundation, and the Department of Interior. ERDA is charged with the development of technology for efficiently using fossil, nuclear, and advanced energy (solar, geothermal, oil shale, and hydrogen).

Program support is being provided by the staff at the University of Maryland: Dr. Frederick Morse, the ERDA/CCMS Representative for the Solar Energy Pilot Study, and Ms. Ingrid Rose, the CCMS Administrative Assistant. As part of their responsibilities, they are developing an information handling system to facilitate the distribution of the special reports and other information between the participating countries; planning and organizing the annual meeting of the CCMS Solar Energy Pilot Study; and performing other administrative duties.

Please note that all correspondence should be directed to the CCMS Solar Energy Pilot Study Director:

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Table 5

U.S. REPORTS FOR DISTRIBUTION

REPORTS SENT OUT

"Report on the Odeillo Solar Energy Experts Meeting." Prepared by the National Science Foundation for presentation at the CCMS Plenary Meeting in Brussels, October 22-23, 1974.

General Electric: "Solar Heating and Cooling of Buildings -- Phase 0 Feasibility and Planning Study: Final Report." Vol. 1, Executive Summary, May 1974. Document No. 74SD4219. (NSF-RA-N-74-021A)

TRW Systems Group: "Solar Heating and Cooling of Buildings -- Phase 0." Vol. 1, Executive Summary, May 1974. TRW Report No. 25168.001. (NSF-RA-N-74-022A)

Westinghouse Electric Corporation: "Solar Heating and Cooling of Buildings -- Phase 0." Final Report, Executive Summary, May 1974. Westinghouse Document No. W-DESC-SS-10275-4. (NSF-RA-N-74-023A)

REPORTS TO BE SENT OUT:

AAI Corporation: "Solar Heating Proof-of-Concept Experiment for a Public School Building." Report for the Period 15 Jan. 1974 to 15 May 1974. Report No. ER-7934. U.S. Government Printing Office Stock Number: 3800-00191.

General Electric: "Final Report of the Solar Heating Experiment on the Grover Cleveland School, Boston, Massachusetts." NSF-RA-N-74-064.

Honeywell: "Report on Solar Heating Proof-of-Concept Experiment for a Public School Building." NSF-RANN-74-119.

InterTechnology "Solar Energy School Heat Augmentation Experiment." ITC Report No. 090974. NSF-RA-N-74-019. U.S. Government Printing Office Stock Number: 038-000-00204.

AIA — "Research, Design, Construction, and Evaluation of a Low Energy Utilization School." Interim Report. August 15, 1974. Prepared by R.G. Stein and C. Stein for the New York City Board of Education. U.S. Government Printing Office Stock Number: 3800-00194.

Honeywell — "Deisgn and Test Report for Transportable Solar Lab Testing Program." NSF-RANN-74-01555A03.

Westinghouse Electric Corporation: — "Solar Heating and Cooling Experiment for a School in Atlanta." Design Report, December 1974. (NSF-RA-N-74-122)

"Solar Energy Utilization for Heating and Cooling." Compiled by John I. Yellot. U.S. Government Printing Office Stock # 3800-00188. Originally published in the ASHRAE Guide and Data Book Series, Applications Volume, 1974.

APPENDIX I

U.S. International Energy Policy, October 1973–November 1975

THE DEPARTMENT OF STATE

Selected Documents No. 3

Bureau of Public Affairs
Office of Media Services

U.S. International Energy Policy October 1973—November 1975

The energy crisis emerged as a major international issue through a sequence of sudden and unexpected events—an oil embargo in October 1973 followed by price increases of 400 percent in less than a single year. These actions—largely the result of political decisions—created an immediate economic crisis, both in the United States and around the world. The elements of the energy problem, however, had been developing over the past 20 years: In 1950, the United States was virtually self-sufficient in oil, whereas by 1973 our reliance on foreign oil had reached 35 percent of our requirements. The experience of the embargo and the subsequent massive price rises taught us how vulnerable we had become.

The crisis focused attention dramatically on the reality of increasing global interdependence. The sheer magnitude and complexity of the issues involved in the energy crisis have compelled us to work toward a cooperative response—initially among the oil-consuming countries and ultimately between consumers and producers. In December 1973 Secretary of State Kissinger called for collective action by the nations of Europe, North America, and Japan to meet the challenge. The outcome was the establishment of the 18-nation International Energy Agency (IEA) in Paris in November 1974. The IEA has made remarkable progress in forging consumer solidarity and in paving the way for a meaningful dialogue with the producer nations. This dialogue hopefully will result in a cooperative long-term relationship between consumers and producers.

The course of U. S. international energy policy from the October 1973 embargo to the current preparation for a Conference on International Economic Cooperation can be traced by certain benchmark documents assembled in this publication. Taken together, they provide a comprehensive picture of America's efforts and determination to meet the challenge of the energy crisis through a policy of cooperation and conciliation.

Arab Oil Embargo

Embargo Reveals U.S. Vulnerability

Excerpt from a statement by Julius L. Katz, Deputy Assistant Secretary for Economic and Business Affairs, before the House Committee on Interstate and Foreign Commerce, November 14, 1973.

. . . . . .

On October 17 the Organization of Arab Petroleum Exporting Countries (OAPEC) announced the adoption of a boycott of oil in support of the Arab war against Israel. OAPEC members agreed at that time to reduce overall production by 10 percent, to embargo all exports to the United States, and to reward "friendly" nations with continuing supplies of oil. The OAPEC boycott has now been expanded to the point where overall production by OAPEC members has been reduced by 25 percent, with an additional 5 percent scheduled for the month of December.

In addition to the United States, the Netherlands has been singled out for full embargo treatment, but reports as to other countries are contradictory. Certain other countries, including the United Kingdom, France, Spain, and Brazil, have been designated as "preferred" countries and as such will be permitted to receive Arab oil at a level equal to their Arab oil purchases during the first nine months of 1973. Most other nations, including such major importing countries as Japan, West Germany, and Italy, are classified as "nonpreferred" and will have to share pro rata any oil remaining from reduced production after the preferred customers have been satisfied. Thus, the impact on this latter group of countries will increase should the boycott continue with progressively larger reductions in production month by month.

As a result of the 25 percent limitation of production now in effect, the availability of oil in the world will be reduced by more than 5 million barrels per day. Should another 5 percent reduction come into effect in December, the decrease in world availabilities could exceed 6 million barrels per day.

Prior to the imposition of the Arab boycott, the United States was importing about 6.3 million barrels per day, of which the Arab producers furnished 1.7 million in direct shipments of crude oil and products refined from Arab oil in third countries. However, even before the cutoff of Arab oil most authorities had counted on importing about 500,000–750,000 additional barrels per day of heating oil from European refineries to cover the additional demands of the 1973–74 heating season. These European supplies will in large part now be lost as a result of the Arab embargo. Thus our total oil deficit during the winter months could be between 2 and 3 million barrels per day, or 10–17 percent of our consumption.

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Washington Energy Conference

Secretary Kissinger Calls for International Energy Cooperation

Excerpts from Secretary Kissinger's address to the Pilgrims of Great Britain in London, December 12, 1973.

. . . . .

The Middle East crisis illustrates the importance of distinguishing the long-range from the ephemeral. The differences of recent months resulted not so much from lack of consultation as from a different perception of three key issues: Was the war primarily a local conflict, or did it have wider significance? Has the energy crisis been caused primarily by the war, or does it have deeper causes? Can our common energy crisis be solved by anything but collective action?

. . . . .

The only long-term solution is a massive effort to provide producers an incentive to increase their supply, to encourage consumers to use existing supplies more rationally, and to develop alternate energy sources.

This is a challenge which the United States could solve alone with great difficulty and that Europe cannot solve in isolation at all. We strongly prefer, and Europe requires, a common enterprise.

To this end, the United States proposes that the nations of Europe, North America, and Japan establish an Energy Action Group of senior and prestigious individuals with a mandate to develop within three months an initial action program for collaboration in all areas of the energy problem. We would leave it to the members of the Nine whether they prefer to participate as the European Community.

The Group would have as its goal the assurance of required energy supplies at reasonable cost. It would define broad principles of cooperation, and it would initiate action in specific areas:

—To conserve energy through more rational utilization of existing supplies;

—To encourage the discovery and development of new sources of energy;

—To give producers an incentive to increase supply; and

—To coordinate an international program of research to develop new technologies that use energy more efficiently and provide alternatives to petroleum. The United States would be willing to contribute our particular skills in such areas as the development of the deep seabed.

The Energy Action Group should not be an exclusive organization of consumers. The producing nations should be invited to join it from the very beginning with respect to any matters of common interest. The problem of finding adequate opportunity for development, and the investment of the proceeds from the sale of energy sources, would appear to be a particularly important area

for consumer-producer cooperation.

As an example of a task for the Energy Action Group, I would cite the field of enriching uranium for use in nuclear power reactors. We know that our need for this raw material will be great in the 1980's. We know that electric utilities will wish to assure their supply at the least possible cost. We know that European countries and Japan will wish to have their own facilities to produce at least part of their needs for enriched uranium. Such plants require huge capital investment. What could be more sensible than that we plan together to assure that scarce resources are not wasted by needless duplication?

The United States is prepared to make a very major financial and intellectual contribution to the objective of solving the energy problem on a common basis. There is no technological problem that the great democracies do not have the capacity to solve together—if they can muster the will and the imagination. The energy crisis of 1973 can become the economic equivalent of the sputnik challenge of 1957. The outcome can be the same. Only this time, the giant step for mankind will be one that America and its closest partners take together for the benefit of all mankind.

. . . . .

Secretary Kissinger Opens the Washington Energy Conference

Excerpts from Secretary Kissinger's opening statement to the Washington Energy Conference, February 11, 1974.

. . . . .

Let me summarize the U.S. views on the major issues confronting us:

First, the energy situation poses severe economic and political problems for *all* nations. Isolated solutions are impossible. Even those countries, like Canada and the United States, capable of solving the energy problem by largely national means would still suffer because of the impact on them of a world economic crisis. Consumer or producer, affluent or poor, mighty or weak—all have a stake in the prosperity and stability of the international economic system.

Second, this challenge can be met successfully only through concerted international action. Its impact is controllable if we work together; it is unmanageable if we do not.

Third, the developing countries must quickly be drawn into consultation and collaboration. Their futures are the most profoundly affected of all. Unable to meet present prices for oil and fertilizer, they face the threat of starvation and the tragedy of abandoned hopes for further economic development. In the name both of humanity and common sense we cannot permit this.

Fourth, cooperation *not* confrontation must mark our relationships with the producers. We each have legitimate interests. We each face looming dangers. We need each other. If we move rapidly and cooperatively toward collective action, all will benefit.

Fifth, the United States recognizes its own national responsibility to contribute significantly to a collective solution. While we are less immediately affected than others, we see it as a matter of enlightened self-interest—and moral responsibility—to collaborate in the survival and restoration of the world economic system. Project Independence, which will reduce the American demand for world supplies, can be a way station on the road to a new Project Interdependence. We are willing to share American advances in energy technology, to develop jointly new sources of supply, and to establish a system of emergency sharing. We are prepared to

make specific proposals in these areas in the follow-on work of this conference.

. . . . .

The great goal of American policy for the past quarter century has been to try to achieve a more cooperative world, to put permanently behind us the narrowly competitive approach which has traditionally ended in conflict—economic or military or both. We maintain our faith in the validity of this goal. In pursuit of the common interest, the United States is willing to make a major contribution, in effort, in science, in technology, and in resources, to a common solution to the energy problem.

The United States is prepared to join with the nations assembled here, and later with the producers and other consumers, to make a truly massive effort toward this major goal: the assurance of abundant energy at reasonable costs to meet the entire world's requirements for economic growth and human needs.

To this end, we suggest that this conference consider seven areas for cooperative exploration: conservation, alternative energy sources, research and development, emergency sharing, international financial cooperation, the less developed countries, consumer-producer relations.

1. *Conservation:* The development of a new energy ethic designed to promote the conservation and most efficient use of existing energy supplies is crucial. We need a basic commitment to share the sacrifices and costs of conservation and thus reduce pressures on world supply. The United States recognizes that it is the world's most profligate energy consumer. Yet our own national program has, within the past four months, reduced government energy use by 20 percent, industrial consumption by more than 10 percent, gasoline consumption by 9 percent, and natural gas and electricity consumed in residential and commercial buildings by 6 and 10 percent respectively. We shall continue to expand this program. We are prepared as well to join other consumers in pledging a sustained conservation effort. The United States is willing to collaborate in a review of the national programs of each consumer country, in an appraisal of their effectiveness, and in recommendations to governments for additional measures.

2. *Alternative Energy Sources:* The demands of this decade cannot be met unless we expand available supplies through vigorous development of alternative energy sources.

To produce quick results, we must concentrate on known fuel resources. Coal is in abundant supply, but we need to develop the technology neglected during the period of low-cost oil. Continental shelves and nonconventional deposits—coal, shale, and similar resources—need to be developed rapidly.

The United States is prepared to explore the following possibilities for consumer cooperation:

—A collective commitment to develop the fossil fuel resources that are available within our respective borders.

—Coordinated policies to encourage the flow of private capital into the new higher cost energy industries, such as synthetic oils and gas from coal and shale.

—Governmental arrangements to accelerate the global search for new energy sources such as offshore oil.

—International programs to reduce the vulnerability of the major industrial countries to the interruption and manipulation of supply, such as the orderly conversion of key sectors away from petroleum.

3. *Research and Development:* New technologies, and not only new explorations, can provide us with additional sources of energy. Many of our countries are launching large new programs. Our own national program contemplates the expenditure of more than $11 billion in government funds over the next five years and an expected investment of $12.5 billion in private funds in the same period. But we have no monopoly on the most advanced and promising approaches. It is to our mutual benefit to coordinate and combine our efforts. Thus the United States is prepared to make a major contribution of its most advanced energy research and development to a broad program of international cooperation in energy.

Without a doubt, a significant portion of new energy will be supplied from nuclear reactors, for which increased quantities of enriched uranium will be needed. Within a framework of broad cooperation in energy, the United States is prepared to examine the sharing of enrichment technology—diffusion and centrifuge. Such a multilateral enrichment effort could be undertaken in a framework of assured supply, geographic dispersion, and controls against further proliferation. We shall submit principles to guide such a cooperative enterprise for the follow-on work which we are proposing.

4. *Emergency Sharing:* The allocation of available supplies in time of emergencies and prolonged shortages is essential.

None of us can be certain how the world balance of supply and demand for petroleum will develop or what political contingencies may arise. But we cannot leave our security or our national economies to forces outside our control.

The United States declares its willingness to share available energy in times of emergency or prolonged shortages. We would be prepared to allocate an agreed portion of our total petroleum supply provided other consuming countries with indigenous production do likewise. As we move toward self-sufficiency, our ability for sharing would of course increase.

Building on the earlier work done in the OECD [Organization for Economic Cooperation and Development], definite recommendations should be submitted to governments including:

—A sharing formula;
—Criteria to determine when a supply shortage exists;
—A mechanism which would implement and terminate the sharing arrangement; and
—Complementary programs such as stockpiling and standby rationing schemes.

5. *International Financial Cooperation:* The structure and strength of the world's trading and monetary system must be restored and strengthened. If there is no way for the industrial countries collectively to eliminate the trade deficits created by their higher oil import bills, they can attempt to do so individually only at the cost of enlarging someone else's problems. In addition, the producing nations are accumulating financial claims against the consuming nations at a rate unprecedented in history.

In the past, the various national and international money markets have efficiently recycled oil revenue funds back into the economies of the consuming countries. At least for industrial countries, these markets can in large part continue to perform that function. The removal of our capital controls and the easing of controls in other countries should help. But the magnitude of the new flows could put serious strains on the operations of these markets. The funds flowing to particular consumer countries may not reflect their needs for balance of payments financing; severe instability could result if these funds were repeatedly shifted across currency boundaries without adequate financial cooperation among the industrialized countries. Here again there is a crucial congruent interest between the producers and consumers and an urgent need for cooperative solutions.

Measures to deal with the economic effects of high oil prices must be adopted on a broad front. Recommendations should include:

—New mechanisms to facilitate the distribution of international capital flows from oil revenue surpluses.
—Means for producers and consumers to cooperate in building confidence in investment policies and the integrity of investments.
—Steps to facilitate the fuller participation of producing nations in existing international institutions and to contribute to the urgent needs of the developing consumer countries.

6. *The Less Developed Countries:* The needs of the developing countries are a particularly urgent dimension of the energy crisis. Massive increases in oil import costs are occurring at a time when the export prospects of many less developed countries have sharply diminished as a result of the slowdown in world economic activity. Even at lower oil prices, the balance of payments problems of the less developed countries

would require sustained attention.

Our approach to this human and economic challenge should be based on several principles:

—The developing consumer countries should be invited to join the next stage of our deliberations.

—Developed countries should avoid cutting their concessional aid programs in response to balance of payments problems. In this regard, the United States will urge the Congress to restore our contribution to the International Development Association (IDA).

—The wealth of the producer nations opens up a potential new source of large-scale capital assistance for development. The producer nations should have a special understanding for the problems facing the poorer nations. We should encourage and facilitate their participation in international and regional institutions.

—Urgent measures must be taken to assure sufficient fertilizer supplies for the coming year. The immediate problem is to provide oil at a price that will allow existing fertilizer production capacity to be fully utilized. The longer term problem is to create sufficient capacity to meet the world's rapidly growing needs. The United States would be prepared to contribute its technological skills to such a joint enterprise.

7. *Consumer-Producer Relations:* Our ultimate goal must be to create a cooperative framework within which producers and consumers will be able to accommodate their differences and reconcile their needs and aspirations. Only in this way can we assure the evolution and growth of the world economy and the stability of international relations. We must work toward the objective of preventing coercion of the weak by the strong as of the strong by the weak; the producing nations must be given a secure stake in an expanding world economy and the consuming nations a secure source of supply.

It seems clear that enlightened self-interest of consumers and producers need not and should not be in conflict. Future generations may not enjoy a permanent source of petroleum. Excessively high prices are already calling forth massive investments in alternative energy sources, which raises the prospect of lower prices and shrunken export markets for the producers in the future. But stable oil earnings, at just prices, wisely invested and increasing by the principle of compound interest, will be available as a long-term source of income.

Thus the producers must have an interest in a "just" price and in stable long-term political and economic relations. Therefore, at the consumer-producer conference for which we are heading, let us discuss what constitutes a just price and how to assure long-term investments. A well-conceived producer-consumer meeting, in which the consumers do not seek selfish advantages either as a group or individually, far from leading to confrontation, could instead lay the basis of a new cooperative relationship. But it will do so only if it is well prepared—and if the consumers have first constructed a solid basis of cooperation among themselves.

. . . . .

Washington Energy Conference Communique

Communique issued at the conclusion of the Washington Energy Conference, February 13, 1974.

Summary Statement

1. Foreign Ministers of Belgium, Canada, Denmark, France, the Federal Republic of Germany, Ireland, Italy, Japan, Luxembourg, The Netherlands, Norway, the United Kingdom, the United States met in Washington from February 11 to 13, 1974. The European Community was represented as such by the President of the Council and the President of the Commission. Finance Ministers, Ministers with responsibility for Energy Affairs, Economic Affairs and Science and Technology Affairs also took part in the

meeting. The Secretary General of the OECD also participated in the meeting. The Ministers examined the international energy situation and its implications and charted a course of actions to meet this challenge which requires constructive and comprehensive solutions. To this end they agreed on specific steps to provide for effective international cooperation. The Ministers affirmed that solutions to the world's energy problem should be sought in consultation with producer countries and other consumers.

Analysis of the Situation

2. They noted that during the past three decades progress in improving productivity and standards of living was greatly facilitated by the ready availability of increasing supplies of energy at fairly stable prices. They recognized that the problem of meeting growing demand existed before the current situation and that the needs of the world economy for increased energy supplies require positive long-term solutions.

3. They concluded that the current energy situation results from an intensification of these underlying factors and from political developments.

4. They reviewed the problems created by the large rise in oil prices and agreed with the serious concern expressed by the International Monetary Fund's Committee of Twenty at its recent Rome meeting over the abrupt and significant changes in prospect for the world balance of payments structure.

5. They agreed that present petroleum prices presented the structure of world trade and finance with an unprecedented situation. They recognized that none of the consuming countries could hope to insulate itself from these developments, or expect to deal with the payments impact of oil prices by the adoption of monetary or trade measures alone. In their view, the present situation, if continued, could lead to a serious deterioration in income and employment, intensify inflationary pressures, and endanger the welfare of nations. They believed that financial measures by themselves will not be able to deal with the strains of the current situation.

6. They expressed their particular concern about the consequences of the situation for the developing countries and recognized the need for efforts by the entire international community to resolve this problem. At current oil prices the additional energy costs for developing countries will cause a serious setback to the prospect for economic development of these countries.

7. *General Conclusions.* They affirmed, that, in the pursuit of national policies, whether in trade, monetary or energy fields, efforts should be made to harmonize the interests of each country on the one hand and the maintenance of the world economic system on the other. Concerted international cooperation between all the countries concerned including oil producing countries could help to accelerate an improvement in the supply and demand situation, ameliorate the adverse economic consequences of the existing situation and lay the groundwork for a more equitable and stable international energy relationship.

8. They felt that these considerations taken as a whole made it essential that there should be a substantial increase of international cooperation in all fields. Each participant in the Conference stated its firm intention to do its utmost to contribute to such an aim, in close cooperation both with the other consumer countries and with the producer countries.

9. They concurred in the need for a comprehensive action program to deal with all facets of the world energy situation by cooperative measures. In so doing they will build on the work of the OECD. They recognized that they may wish to invite, as appropriate, other countries to join with them in these efforts. Such an action program of international cooperation would include, as appropriate, the sharing of means and efforts, while concerting national policies, in such areas as:

—The conservation of energy and restraint of demand.

—A system of allocating oil supplies in times of emergency and severe shortages.

—The acceleration of development of additional energy sources so as to diversify energy supplies.

—The acceleration of energy research and development programs through international cooperative efforts.[1]

10. With respect to monetary and economic questions, they decided to intensify their cooperation and to give impetus to the work being undertaken in the IMF, the World Bank and the OECD on the economic and monetary consequences of the current energy situation, in particular to deal with balance of payments disequilibria. They agreed that:

—In dealing with the balance of payments impact of oil prices they stressed the importance of avoiding competitive depreciation and the escalation of restrictions on trade and payments or disruptive actions in external borrowing.*[2]

—While financial cooperation can only partially alleviate the problems which have recently arisen for the international economic system, they will intensify work on short-term financial measures and possible longer-term mechanisms to reinforce existing official and market credit facilities.*

—They will pursue domestic economic policies which will reduce as much as possible the difficulties resulting from the current energy cost levels.*

—They will make strenuous efforts to maintain and enlarge the flow of development aid bilaterally and through multilateral institutions, on the basis of international solidarity embracing all countries with appropriate resources.

11. Further, they have agreed to accelerate wher-

[1] France does not accept point 9. [Footnote in original.]

[2] In point 10, France does not accept paragraphs cited with asterisks. [Footnote in original.]

ever practicable their own national programs of new energy sources and technology which will help the overall world-wide supply and demand situation.

12. They agreed to examine in detail the role of international oil companies.

13. They stressed the continued importance of maintaining and improving the natural environment as part of developing energy sources and agreed to make this an important goal of their activity.

14. They further agreed that there was need to develop a cooperative multilateral relationship with producing countries, and other consuming countries that takes into account the long-term interests of all. They are ready to exchange technical information with these countries on the problem of stabilizing energy supplies with regard to quantity and prices.

15. They welcomed the initiatives in the UN to deal with the larger issues of energy and primary products at a world-wide level and in particular for a special session of the UN General Assembly.

Establishment of Follow-on Machinery

16. They agreed to establish a coordinating group headed by senior officials to direct and to coordinate the development of the actions referred to above. The coordinating group shall decide how best to organize its work. It should:

—Monitor and give focus to the tasks that might be addressed in existing organizations;

—Establish such *ad hoc* working groups as may be necessary to undertake tasks for which there are presently no suitable bodies;

—Direct preparations of a conference of consumer and producer countries which will be held at the earliest possible opportunity and which, if necessary, will be preceded by a further meeting of consumer countries.[2]

17. They agreed that the preparations for such meetings should involve consultations with developing countries and other consumer and producer countries.[2]

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[2] France does not accept points 16 and 17. [Footnote in original.]

International Energy Agency

Establishment of IEA

News release issued by the Organization for Economic Cooperation and Development in Paris, November 15, 1974.

The Council of the Organization for Economic Cooperation and Development (OECD) today decided to set up an International Energy Agency within the organization.

The task of this agency will be to carry out a comprehensive program of cooperation on the lines determined in the preparatory work of the coordinating group set up following the Washington Energy Conference. The main aims are:

—Development of a common level of emergency self-sufficiency in oil supplies, common demand restraint measures, and measures for the allocation of available oil in time of emergency;

—Development and implementation of a long-term cooperation program to reduce dependence on imported oil;

—Promotion of cooperative relations with oil-producing countries and with other oil-consuming countries.

Member countries initially participating in the work of the agency are: Austria, Belgium, Canada, Denmark, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

Membership in the agency is open to all OECD member countries able and willing to comply with the obligations of the program.

In adopting the decision establishing the agency, the Council expressed its determination to continue and, where appropriate, to strengthen the cooperation of all member countries in the field of energy and all related matters.

The governing board of the new agency will hold its first meeting at OECD headquarters on the 18th of November 1974, when the International Energy Program will be officially adopted.

Adoption of International Energy Program

Statement released by the Governing Board of the IEA following its first meeting in Paris, November 18, 1974.

The energy crisis has clearly shown the need for international cooperation in this field. The agreement relating to an International Energy Program is accordingly the outcome of a joint endeavor to further cooperation among the Organization for Eco-

nomic Cooperation and Development (OECD) countries. It is an act to promote closer relations and solidarity, from which any notion of antagonism or confrontation directed at any quarter is absolutely excluded.

The coordinating group set up by the February 1974 Washington conference has met on a number of occasions; last September it submitted a program of action to the other OECD countries and completed its work. The following countries signed the agreement on November 18: Austria, Belgium, Canada, Denmark, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

In order to meet the aims which the participating countries have set for themselves, this cooperation has to fulfill at least two imperative requirements:

—It must make it possible at any time to have a "horizontal" view of energy questions in all their aspects, whether technological, scientific, commercial, monetary, financial, or political;
—It must incorporate operational arrangements capable of providing a framework for cooperation and of rapidly being put in motion on the basis of efficient decisionmaking machinery.

These two principles should be the foundation for the agency's operation.

The signatory countries have expressed the wish that the agency appointed to carry out the program should be a body of the OECD, an organization to which they belong and in which they have been cooperating for a number of years.

Under the proposed arrangements, namely the establishment of the agency as an autonomous body within the framework of the organization, two aims can be reconciled: the necessary political impetus and efficiency of the work can be maintained, while on the other hand the fund of knowledge and the logistic resources of an experienced organization can be drawn upon. The agency is not intended to take the place of existing organizations.

In addition, the fact of not setting up an entirely new international organization confirms the desire of the signatory countries not to build a system of confrontation vis-a-vis any quarter, but on the contrary to contribute to a new system of international cooperation.

From the outset, the participants have shown special interest in the problem of cooperation with oil-producing countries and with other oil-consuming countries; its aims in this regard are confirmed in article 44 of the agreement. The signatory countries wish this cooperation to be one of the new agency's main activities. The governing board will be helped in this task by a standing group.

In the matter of long-term cooperation, one of the fundamental problems is lesser dependence by the signatory countries in the future on the use of oil.

The expression, "long-term cooperation," must not be interpreted in a dilatory sense; on the contrary, the participating countries intend to undertake efforts forthwith, the effects of which will become evident in the medium or long term. Article 43 of the agreement moreover fixes a deadline for the decision which the governing board is to take on the proposals made to it.

The field of action of the standing group on long-term cooperation is particularly vast since, in addition to research and development in 10 priority areas, it includes rational use of energy, uranium enrichment, and the development of alternative sources of energy, while not forgetting protection of the environment.

In addition to these activities, the intention of the signatory countries was, as it were, to take out insurance in regard to possible difficulties of supply. They have accordingly established a program of emergency measures, including a system of oil sharing in an emergency, which system must be precise and strict in view of the difficulties that might arise. Because of the subject matter chapters I to IV are particularly detailed, but it would be a mistake to infer from this that they are of a more fundamental nature than the others, or even that they constitute the essential part of the program.

In the event of an emergency, the purpose

of the scheme is to solve member countries' difficulties; in so doing the signatory countries will take into consideration the needs of other countries. Article 11 of the agreement sets out the objectives of the program.

Chapters V and VI of the agreement contain provisions regarding the cooperation of the oil companies. These provisions go beyond what is required in an emergency, since they aim to establish within the agency a permanent framework for consultation and an information system which will include a general section on structures and the activities of companies, and on costs and prices.

The recent meeting between representatives of the coordinating group and the major oil companies constituted a good start for future work.

The agreement is open to all OECD countries wishing to join which are able and willing to meet its requirements. The agreement is also open to the European Communities, and it is stated that it cannot in any way impede the implementation of the treaties establishing those communities.

Norway has not become a party to the agreement, although it shares the views of the signatory countries on the need for cooperation and solidarity in energy matters. It has suggested it should explore with the agency the possibility of entering into an agreement with the latter. The governing board will examine this proposal.

Strategy of Consumer Cooperation in IEA

Excerpt from a statement by Thomas O. Enders, Assistant Secretary for Economic and Business Affairs, before the Senate Committee on Interior and Insular Affairs, February 13, 1975.

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Over the past year, the central objective of our international energy policy has been the development of a comprehensive framework for consumer country cooperation. These efforts had their formal beginning with the Washington Energy Conference in February 1974 and continued through the work of the Energy Coordinating Group set up at the time of the Washington Conference. This group of 12 nations (the United Kingdom, the Federal Republic of Germany, Italy, the Netherlands, Belgium, Luxembourg, Denmark, Ireland, Norway, Canada, Japan, and the United States) undertook to develop a cooperative international action program to deal with the world energy situation.

The result was the establishment, last November, of the International Energy Agency under OECD [Organization for Economic Cooperation and Development] auspices.[1] The Agency initially had 16 participating countries: Belgium, the Netherlands, Luxembourg, Germany, Italy, Denmark, Ireland, the United Kingdom, Spain, Sweden, Switzerland, Austria, Turkey, Canada, the United States, and Japan. In the period since its formation, New Zealand has also become a member and Norway has become an associate member.

Throughout the negotiations which led to the formation of the IEA, we pressed for a common and comprehensive approach by consumer countries to energy problems. From the outset the United States has believed that only through such an approach can we hope to solve the world energy crisis. Last year's oil embargo and the subsequent sudden massive increase of oil prices clearly demonstrated the high cost of an uncoordinated approach by consumer countries to their growing dependence on imported oil. Evidence of this cost was visible in the scramble for oil at any price, in the serious economic disruption in importing countries, and in the threat to the political, economic,

[1] The Agreement on an International Energy Program was signed at Paris on Nov. 18, 1974.

and security cohesion of the industrialized countries. Indeed, the independence of political decision of the industrialized democracies was put under a shadow by the oil embargo. It became clear that if that independence, and the integrity of the political, economic, and social systems of the West, are to be maintained, the energy crisis and the threat of future oil embargoes had to be dealt with by the cooperative action of the industrialized democracies.

In order to avoid a recurrence of the unacceptable costs of the oil embargo, we and our partners set as our first objective the development of a capability to deal with future supply interruptions in a cooperative framework. The emergency program which has emerged from these negotiations provides us with a safety net which would be in place should a supply emergency develop in the future. We and our partners have also agreed on the need to develop a long-term program to reduce the dependence of the industrialized democracies on imported oil through joint programs and efforts in the fields of conservation and the development of alternative energy supplies.

In addition to these efforts, which are part of the International Energy Program adopted by the International Energy Agency, the major industrial countries have also decided to create a financial safety net in the form of a $25 billion solidarity fund for mutual support in financial crisis.

Together, the International Energy Program of the IEA and the financial solidarity fund represent the first concrete steps in the development of the cooperative consumer approach to energy crisis issues which the United States has sought from the outset. In an energy picture which is largely grim, these vital initiatives reassuringly stand out. The security and well-being of the people of the United States require that these initiatives be implemented and developed to their full potential.

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Accelerated Development of New Energy Sources

Excerpts from a statement by Thomas O. Enders, Assistant Secretary for Economic and Business Affairs, before the Subcommittees on International Organizations and on International Resources, Food, and Energy of the House Committee on International Relations, March 26, 1975.

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Alternative Energy Development

On March 20, 1975, the IEA Governing Board confirmed a preliminary understanding of the major elements and basic principles of a coordinated system of cooperation in the accelerated development of new sources of energy. This is an essential part of our overall cooperative effort. Energy conservation can play a critical role in limiting our dependence on imported oil, especially over the next few years. But over the longer term, we must develop new sources of energy if we are both to achieve our reduced import dependence objectives and also to sustain a satisfactory rate of economic growth. In addition, the development of new sources of energy is essential to the creation of supply-and-demand conditions which will eventually force a reduction in the world oil price.

Higher oil prices will by themselves bring about important investments in new energy supplies. But the magnitude of the problem is so great that we cannot rely on market forces alone. Governments must act to reinforce and stimulate these market forces if we are to reduce our import dependence and our vulnerability to embargoes and arbitrary price increases.

The preliminary agreement reached in the IEA on a coordinated system of cooperation in the accelerated development of new energy is explicit recognition of this need for govern-

mental action. The coordinated system would consist of three interlinked elements:

—An agreement to encourage and safeguard investment in the bulk of conventional energy sources through the establishment of a common minimum price below which we would not allow imported oil to be sold within our economies;

—A framework of cooperation to provide specific incentives to investment in higher cost energy on a project-by-project basis; and

—Cooperation in energy research and development, including the pooling of national programs in selected projects.

Common Minimum Price for Imported Oil

The first element of this system, agreement on a minimum safeguarded price, is designed to resolve the critical dilemma which we face in the development of new energy sources. As I mentioned previously, the IEA countries have substantial new energy sources which can be developed. However, most of these, such as outer continental shelf oil, Alaskan oil, coal, et cetera, are relatively high cost. Moreover, their development will require enormous capital investments. The OPEC [Organization of Petroleum Exporting Countries] cartel, with production costs averaging some 25 cents per barrel, would clearly have the capability to undercut the development of these alternative sources at will. Thus, unless we provide some level of protection to domestic investors against possible competition from very low-cost imported oil, we risk a shortfall in the investment needed to meet our reduced dependence objectives. Further analysis will be required before this minimum level of price is set. It would be substantially below current world oil prices, although higher than prices prevailing before October 1973.

It is equally important to underline what this minimum import-price agreement will not provide. It will not be a price guarantee for OPEC; rather, it would be a guarantee of minimum protection for domestic investors in IEA countries. Also, it will not provide a floor price for all energy sold domestically; it would apply only to imported oil.

Why is this proposed commitment to a common minimum price for imported oil in the U.S. interest? First, as I have explained, it will help to assure that we get the investment needed in new energy to bring about over the medium term a sharp shift in the world supply-and-demand balance for oil. Only by making an unequivocal commitment to the accelerated development of alternative sources can we gain sufficient power in the marketplace to assure that OPEC will not be able to arbitrarily manipulate oil prices in the future.

At the same time it will help to equalize energy costs among the industrialized countries. Without an agreement of this type, the United States, which will make a major commitment to the development of relatively expensive energy, would find itself at a competitive disadvantage when the world oil price breaks and the other industrialized countries have the opportunity to import very low-cost oil.

This system of a minimum import price has several advantages over possible alternative schemes to encourage and protect investment in conventional energy sources such as a deficiency-payments mechanism. A deficiency-payments system would impose a massive financial burden on the taxpayer when world oil prices dropped and, by allowing lower prices, would stimulate consumption and imports. In contrast, the minimum safeguarded price mechanism would not only provide protection for new investment and a check on consumption but would also generate additional tax revenues when the world oil price declined.

At this point we are not inclined to try to dictate the policy mechanism which IEA countries might use to fulfill this commitment. We would propose that countries be left free to use a variable levy, import quotas, or other appropriate mechanisms.

Joint Undertakings and R. & D. Projects

The second basic element of the accelerated development system would promote, on a project-by-project basis, joint undertakings in higher cost energy projects. The development of synthetic fuels and other major

energy projects, perhaps including some of a conventional nature, would be fostered under this program. This measure would deal with projects involving large capital and developmental expenditures and would provide IEA countries with the opportunity to participate in each other's programs under agreed rules covering investment, access to technology, and access to production.

The third tier of the system is designed to encourage cooperative projects in research and development on energy. The IEA would assist in identifying and establishing joint R. & D. projects on which countries would pool national efforts. By definition, projects in this third tier would involve expenditures which are not likely to yield immediate returns but which offer significant potential for longrun cost savings or energy breakthroughs. Under this approach we can avoid duplication of effort and rationalize our spending.

Mr. Chairman, the coordinated system for accelerated development should be viewed in its entirety. It is designed to provide a balance of advantage between those countries with huge potential to develop indigenous energy supplies and those which will continue to have to rely on imported oil to meet a substantial portion of their energy requirements.

All consuming countries stand to benefit directly from the development of new energy in other consuming countries. These new energy supplies will impact directly on world supply and demand for OPEC oil and will contribute to the eventual decline in world oil prices. Thus we all have much to gain from cooperation which stimulates the development of new energy.

We will continue to consult closely with the Congress over the coming months on the elaboration of this preliminary understanding. Its implementation would of course require legislative authority in each country. The Administration has already requested legislation, title IX of the Energy Independence Act of 1975, which would provide such implementing authority. We will seek further consultations with the Congress on the manner in which such authority could be granted and used.

Mr. Chairman, we have had many opportunities for false comfort since the oil crisis began: A surplus of oil in the international market last summer because of seasonal factors and price resistance, some signs of undercover price cutting, and pronouncements that the oil cartel was about to break.

But, Mr. Chairman, the oil crisis will not simply go away. We must act to defuse it by bringing our own consumption of oil under control, by developing our own energy supplies, and by encouraging other consuming countries to do likewise. Only in this way can we achieve our two essential objectives: A significant decrease in the international price of oil and substantial U.S. self-sufficiency in energy.

U.S. Statement at IEA Ministerial Meeting

Statement by Secretary Kissinger before the Ministerial Meeting of the IEA in Paris, May 27, 1975.

Today we begin a week of deliberation on the central problems of the industrial democracies: energy, economic prosperity, the building of a constructive relationship with the developing nations, and insuring the security of our own countries.

Of these, no issue is more basic to the future than the challenge of energy. The fundamental achievements of our economies, and the modern civilization they sustain, have been built upon the ready availability of energy at reasonable prices.

The energy crisis of 1973 first brought home to us the full implications of the new reality of global interdependence. Energy stands as the first and most fundamental of

these new problems; its magnitude compels us to cooperation. Without that cooperation, we risk a return to nationalistic rivalry and economic decline comparable to the bitter experience of the thirties. Now all nations—rich and poor, industrialized and developing—must decide whether growing interdependence will foster common progress or common disaster.

Our objective must be to construct a world energy system capable of providing, on terms fair to all, the fuels needed to continue and extend the progress of our economies and our societies. The path that the members of this Agency have chosen begins with consumer solidarity. But a durable international system must ultimately encompass, and be built by, both the consumers and the producers of the world's energy.

This Agency has made remarkable progress since the Washington Energy Conference 15 months ago. We recognized at Washington that the energy crisis was the most severe challenge to industrial civilization since the Second World War. For a generation North America, Europe, and Japan increasingly allowed oil imports to replace their own energy production. In 1950 the industrialized world imported 5 percent of its requirements. In 1960, this had grown to 17 percent; by 1972, it had reached 39 percent.

The embargo and price rises of 1973 taught us how vulnerable we had become. We saw that neither the supply nor the price of a central factor in our economies was any longer under our control. Our well-being and progress had become hostage to decisions in which we could not take part. At the Washington Energy Conference we recognized that only collective action could reduce our excessive dependence on imported oil and restore to our governments mastery over our own economies and foreign policies. Separately we could never create conditions for lower oil prices. Nor could any one of us, except at exorbitant cost, defend against a new embargo. Our security, our economic growth, our role in the world, were at risk.

Nothing so vividly demonstrates the cooperative vitality of the industrial democracies as the speed and imagination with which this Agency acted on these conclusions. It articulated a realistic strategy for attacking the problems of price and supply and launched a series of major steps which together make up the elements of a comprehensive program:

—To safeguard against future energy emergencies, we committed ourselves to build stocks of oil and, in the event of an embargo, to cut our consumption by an equal percentage and to share available oil.

—For financial solidarity, the nations comprising the OECD agreed on a fund of $25 billion to protect against financial disruption from oil deficits or from arbitrary shifts of funds by the producers.

—To prevent an increase in our vulnerability over the next few years, we set conservation goals and agreed on procedures to verify their implementation.

—To lessen our long-term vulnerability, we agreed on an ambitious policy to develop new energy sources through cooperation on individual development projects and safeguarded by a minimum price mechanism.

—To develop the technology to achieve independence by the end of the century, we established a far-reaching program of cooperation in energy research and development.

—Finally, we recognized the reality of the new economic and political conditions in which we are acting. Over the long term, a stable world energy economy must have the support and serve the interests of both consumers and producers. Therefore we in this Agency have committed ourselves to seek a long-term cooperative economic relationship with the energy-producing nations. This Agency has been the principal forum for our preparation for the dialogue with the producers.

In the short term, our objective in this Agency has been to restore the balance in the international energy market. Through rigorous conservation and the development of alternative sources, we have sought to create such a surplus of capacity that the flexibility of decision of the producers will be reduced. As our conservation policies

gain momentum, our dependence on imported oil can at least be kept constant, while our economies recover from the recent recession. As the proportion of our energy needs from our own production increases, the producers' market will begin to shrink, first relatively and then in absolute terms. The producers will have to distribute ever-larger cutbacks among themselves to maintain the high prices, and even larger cutbacks to support an increase. Individual producers, especially those with ambitious development, defense, and other spending programs, will be under pressure to increase sales or at least to refuse further production cuts. Thus at some point, if this process succeeds, the cartel will have lost the exclusive and arbitrary control over prices.

We acknowledged from the start that our countries vary widely in energy needs and potential. Some of us have major and as yet untapped oil, gas, and coal reserves. Others must rely almost entirely on nuclear energy and new technology to reduce national dependence on imported oil.

This very diversity gives a strong impetus to our cooperation. Because of our interdependence, we all have an interest in each other's success. The action each country takes to reduce its vulnerability reduces the vulnerability of us all. And the decision to work cooperatively assures an equitable sharing of costs and benefits. The sacrifices of one country will not simply be offset by the failure of other nations.

All elements of our strategy are linked. Plans to deal with an emergency will prove empty if we permit our dependence on imported oil to mount year by year. Efforts to develop a new relationship with the producers will be thwarted if we fail to create the objective conditions for a new equilibrium through programs of conservation and the development of alternative supplies.

Many of the basic building blocks of our strategy are in place. But much remains to be done. This first ministerial meeting of the IEA faces the following urgent tasks:

—To impose determined conservation programs before our economies begin to expand again;

—To put into effect strong new incentives for developing alternative sources;

—To accelerate research on long-term development of nonconventional energy supplies; and

—To prepare thoroughly for a dialogue with the producers.

Let me deal with each of these in turn.

The cardinal objective of any energy program must be the limitation of growth of consumption. However much we augment our own energy production, in the medium term it cannot keep pace with the extravagant annual consumption increases of the 1960's.

Conservation will be particularly important over the next few years. Until North Sea and Alaskan oil and additional coal and nuclear power become available in quantity, it is the only means we have to limit our vulnerability.

In February, we agreed that the IEA countries should save 2 million barrels a day by the end of this year. The recession has put us ahead of that target. But the reduction in consumption caused by the recession has also led to complacency about the need for a strong conservation policy. This has delayed—in America and elsewhere—the imposition of conservation measures that will assure us of future savings.

We must recognize that most of our current savings result not from policy decisions but from the reduction in overall economic activity caused by the recession. During this spring's decline in demand for oil, the oil producers have absorbed the production cuts required to keep supply in line with demand, leaving the basic price structure intact. Price rises have been difficult. But as growth resumes in the industrial economies, and with a normal or cold winter, our demand for oil will inevitably increase.

Unless we convert our recession-induced conservation to policy-induced conservation, the producers will benefit from a stronger market. We will become increasingly vulnerable to price rises and the political manipulation of energy supply. Indeed, we have already been warned of new price increases.

These would be economically unjustified, for there is much surplus production capacity, inflation is slowing, and oil prices are already at historic highs. Yet the market remains under the substantial control of the producers; it will become more so unless we impose upon ourselves a rigorous energy program and put immediate impetus behind our conservation efforts.

In January, President Ford set a goal for the United States of saving 2 million barrels a day by the end of 1977. Later today, the President will announce additional measures to discourage the consumption of imported oil.

Together with actions already taken, this will bring the total estimated U.S. savings to 1.2 million barrels a day by the end of 1977. The President hopes that the Congress will join him in common action to bring about the remaining savings needed to meet our goal of 2 million barrels. But should this not prove possible, he is prepared to use the powers available to him to assure that the United States does its part in the common conservation effort.

We believe it essential that the IEA develop conservation goals which will prevent our vulnerability from increasing during 1976 and 1977. Because the United States is responsible for half the total oil consumption of IEA members, it pledges itself to half the savings. If, together, we can save 4 million barrels a day by the end of 1977, we can prevent our collective imports of oil from increasing above present levels even after a period of economic growth. OPEC's [Organization of Petroleum Exporting Countries] ability to raise prices arbitrarily will have been diminished. And we will have reduced our oil payments deficit by many billions of dollars. But should we fail, the cost will be not only higher prices but also increasing economic and political vulnerability.

Alternative Sources

Over the longer term, our dependence on imported oil will become irreversible unless we rapidly develop new energy sources—oil, gas, coal, nuclear power. This is all the more urgent because the economic costs of the current level of high prices will multiply over time. At present, much of the producers' surplus revenues are recycled into investments in the industrialized countries. This is welcome as a short-term alleviation of the balance-of-payments drain. But, if current prices hold, sooner or later the imports of producers will rise dramatically. There will occur an increasing drain of goods and services from our economies.

If we are to lessen our vulnerability, energy production from alternative sources must, at a minimum, substantially reduce current IEA imports of 25 million barrels per day. Three actions are needed to accomplish this:

—We must remove or modify many of our governmental constraints on energy production. Energy development is encumbered everywhere by legal, environmental, and regulatory limitations. Many of these reflect valid social goals; others could usefully be reviewed or modified, or alternative safeguards could be devised. We should use this organization as a clearinghouse for ideas to remove unnecessary obstacles to alternative energy sources.

—We must make sure that sufficient financing is available to assure energy development. Enormous amounts of capital will be required—perhaps a thousand billion dollars in the next 10 years. Each country should decide the arrangements best suited to meet this requirement, but we should proceed now to establish an IEA framework for project-by-project cooperation, including joint guarantees or other financial assistance to large cooperative projects.

—We must insure that our energy investments are protected against disruptive competition. For much of the Persian Gulf, production costs are only about 25 cents a barrel. Most of the major continental energy sources—new Alaskan North Slope oil, the U.S. outer continental shelf, North Sea oil, nuclear power everywhere—will be many times more costly to produce. If the cartel decides to undercut alternative sources by temporary, predatory price-cutting, invest-

ment in alternative sources may be inhibited or abandoned. The producers' pricing policies could thus keep us in a permanent state of dependence, and we would hardly have assurance that the price would not be raised again once our dependence was confirmed.

This is why we in the IEA have agreed in principle on the safeguard price mechanism. Only if consumers develop massive new energy sources will the oil producers lose their ability to set prices at high, artificial levels. But these sources will not be developed if producers retain the ability to thwart our energy programs by temporary, predatory price cuts. A minimum safeguard price—well below the current world price level—can help insure that these alternative sources will be developed.

We are obviously not proposing a guaranteed price for OPEC. On the contrary, if our policy succeeds, and as large quantities of new energy become available, OPEC's selling price could fall below the protected level. The minimum safeguard price can be implemented in a variety of ways—through tariffs, quotas, or variable levies. The difference between the world price and the higher domestic price would thus accrue to our governments in the form of import taxes and levies. These could be used for social programs or rebates or other national programs of our own choosing. In short, the minimum safeguard price is not a device for maintaining artificially high world oil prices. On the contrary, it is a device for making sure that they come down. And it can be designed to yield the benefits from such reduction to the industrial countries.

The agreed deadline for elaboration of the IEA overall alternative sources program is July 1. We must meet it. President Ford has asked me to emphasize the urgency of this task. Without clear incentives for major new energy investments rapidly put into place, IEA countries can never hope to reduce their current excessive vulnerability.

Nuclear Power for Energy Production

In the quest for greater energy self-reliance, nuclear power will be critical. By 1985, the European Community hopes that nuclear power will generate about one-quarter of its electricity; Japan, a third; the United States, perhaps a third. But there are major problems associated with the orderly, safe, and prudent introduction of this important new technology.

In all our countries, the growth of nuclear power produces both hope and anxiety. On the one hand, we recognize it as the only potential large-scale energy substitute for the inevitable exhaustion of supplies of oil and gas which would occur by the end of this century. On the other hand, there are increasing doubts that sufficient nuclear fuel will become available. Enormous amounts of capital will be needed to build reactors, severely straining existing capital markets. And we all know of the questions raised by the public and some legislators regarding the environmental impact of the widespread construction of nuclear facilities.

Thus we must move urgently and decisively within the IEA on the following program:

—We must insure that needed uranium enrichment facilities are constructed on schedule. In this regard, the United States recognizes its responsibility to continue providing nuclear fuel under long-term contract. Our policy is to bring into being—preferably by private industry but by the Federal Government if necessary—additional enrichment capacity which will insure adequate future supply. Negotiations are now underway with a potential private source. These discussions will proceed quickly, and by June 30, the President will decide which course of action, private or public, is in the best interests of our own country and those abroad who rely on us. We will then be in a position to accept long-term orders.

—We must intensify our joint efforts to map and analyze future demand and supply of fuel, including assessing the availability of uranium resources.

—We should jointly project the capital requirements of the nuclear sector for the next 10 years and consider how our governments, individually and cooperatively, can assist in meeting those requirements.

—We should evaluate the economic neces-

sity, plant requirements, and safety implications of plutonium reprocessing, recycling, and storage.

—We must undertake intensive efforts to improve the safety and security of nuclear materials, equipment, and operation.

—And finally, we should develop balanced information programs to bring perceptions of the risks and benefits of nuclear energy in line with reality.

Several of the technical issues involved are already being dealt with by the OECD's Nuclear Energy Agency. That work should of course continue.

Research and Development

Beyond the next decade, a central issue will be how to create new nonconventional energy sources. It is in developing these new sources that IEA's program of cooperation may make its most important and lasting contribution.

For the long-range energy future depends not on the Persian Gulf, or the North Sea, or Alaska. It does depend on what we do in our laboratories to make better use of conventional newer sources and to develop more exotic sources.

The advanced nations have vast scientific and technical capabilities. Over the past year and a half, IEA member countries have expanded their national programs in energy research and development. In the United States our new Energy Research and Development Administration will spend more than $2 billion in the fiscal year beginning next month. American industry will invest far more than that.

The U.S. program emphasizes improving the efficiency of energy generation, transportation, and use; improving the recovery of oil and new uses of coal; and converting coal to synthetic oil and gas. These projects are designed to produce major advances in energy production and use in this century. For the period beyond the year 2000, only three known potential sources of energy have virtually infinite potential for expansion: the breeder reactor, nuclear fusion, and solar energy. These all have a high priority in the U.S. program.

The IEA program in these fields reflects the conviction that technical advance will be accelerated through cooperative efforts and facilitate the flow of information and knowledge. We have decided to link our national programs through coordinated planning, intensified information exchange, and through joint projects which pool our capital, industrial skills, and technology.

The early results are promising. We have moved forward rapidly on nine joint projects ranging from energy conservation to nuclear power. Important programs in coal processing, which involve substantial joint investments of money and manpower, are about to begin.

But a sustained program of cooperation requires much more. We have identified the existing and potential technologies that will have a critical impact on the future. We must now ascertain when these technologies can be implemented, what their production potential is, and which are best suited to large-scale joint projects.

As our cooperation expands, projects will increasingly operate at the frontier of technology. We will each have to recognize that we cannot retain the most promising projects solely for our own national purposes. We must establish guidelines which, while taking account of understandable concern over the sharing of information and the possible loss of commercial advantage, give impetus to multilateral cooperation.

Therefore, I propose that our leading research and development officials meet in early autumn at the special session of the Governing Board. Their goal would be to complete the design of a joint energy research and development program that will receive high priority in all of our national planning.

Relations With Producers

The final element of our energy strategy is the development of a cooperative relationship with producers. We must face the fact that the producers have the ability now and for some time to come to determine the sup-

ply and the price of our oil. But the decisions we make now on conservation and alternative sources will determine whether in the future prices will be set by political decision or economic competition.

Yet there exists no institution or agreed framework in which the exercise of the undoubted powers of both groups can be subject to discussion and mutual accommodation.

Since its start, IEA has been committed to the search for a new relationship with the producers which would take into account the needs and aspirations of both sides. The solidarity we have achieved in IEA is a necessary condition for building that broader structure.

Before the recent preparatory conference between producers and consumers, the IEA agreed on several possible areas for joint action by producers and consumers. These remain fruitful topics for dialogue:

—First, we should discuss the management of financial recycling. Both producers and consumers have an interest in the effective reinvestment of surplus funds.

—Second, we should jointly examine the incoming-investment policies of the industrialized countries. The oil producers need attractive outlets for their revenues; the industrial countries, while they welcome new investment, will want to retain control of those sectors of their economies which they consider critical.

—Third, we can examine cooperative efforts to accelerate the development programs in producer countries. New industries can be established, combining the technology of the industrialized world with the energy and capital of the producers. Fertilizer is a promising example.

—Fourth, the oil-producing countries and the industrial consuming countries share responsibility for easing the plight of the poorest nations. International development efforts have been undermined by the current economic crisis; high prices for energy have shattered the hopes of developing nations for industrialization; high petrochemical costs have made needed fertilizer prohibitively expensive and compounded the difficulties of producing enough food to feed the hungry. Special efforts must be made on behalf of those most seriously affected. The newly rich producing nations have an obligation to join us in this effort.

—And finally, there is an obvious need for a forum in which producers and consumers can discuss the difficult issues of oil prices and security of supply. This dialogue is not, of course, a substitute for our own efforts on conservation and the development of new supplies. But while we cannot protect these vital interests only by discussions with producers, both consumers and producers can benefit from a serious dialogue regarding their respective interests and objectives.

It has become clear—as a result of the April preparatory meeting—that the dialogue between the producers and consumers will not progress unless it is broadened to include the general issue of the relationship between developing and developed countries.

We in the IEA have no reason to recoil from a discussion of all the issues of concern to developing countries. I recently set forth my country's ideas on raw materials and commodities problems; I proposed that these now be addressed in the multilateral trade negotiations, in individual commodity groups, and in the World Bank. I shall put forward further proposals at the OECD tomorrow. I hope that these ideas as well as proposals put forward by others can help overcome the impasse in the producer-consumer dialogue.

The United States is prepared to have the preparatory meeting reconvene in Paris in the same format as before. In order to carry its work forward, commissions should be created to deal with critical areas such as energy, problems of the most seriously affected nations, and raw materials. Each commission would review the range of issues under its heading: finance, investment, trade, production. The commissions could meet consecutively or simultaneously, but without an arbitrary deadline for concluding their work. The commissions on raw materials and the problems of the most seriously affected nations would not supplant the already substantial work which is being done

elsewhere. Rather, they would monitor, supplement, and orient that work and give it needed impetus.

Membership in these commissions should be limited if they are to be effective. We suggest that this be decided by objective criteria. In energy, for example, countries exporting or importing more than a certain volume of energy in the world market should be members. On the commission dealing with the most seriously affected countries, those with the lowest per capita income would participate along with traditional and new aid donors. The commission on commodities could include the principal exporters and importers of food and non-oil raw materials.

We suggest that the IEA discuss these concepts and coordinate our contacts with the countries that attended the April meeting, and especially with France as the convening country, to determine when and how the preparatory meeting could be reassembled.

This Agency has already demonstrated what can be accomplished if nations have the vision to perceive their interest and the will to act upon it. We have set ourselves important goals including broadening the pattern of cooperation already established here. We are called upon to make concrete progress; this will require readiness to look beyond our own concerns as industrialized nations to the broader needs of all mankind.

The progress we have made in a short 15 months should give us great hope for the future. Goethe said that "The web of this world is woven of necessity and chance." We stand at a point where those strands intertwine. We must not regard necessity as capricious nor leave change to chance. Necessity impels us to where we are but summons us to choose where we go. Our interdependence will make us thrive together or decline together. We can drift, or we can decide. We have no excuse for failure. We have it in our power to build a better future.

Ministerial Meeting Communique

Communique of the Ministerial Meeting of the IEA in Paris, May 27, 1975.

The Governing Board of the International Energy Agency met at Ministerial level in Paris on 27th May, 1975, under the Chairmanship of Mr. Renaat van Elslande, Minister for Foreign Affairs of the Kingdom of Belgium.

1. Ministers noted that the events of recent years have highlighted the importance for the world economy of a regular and stable energy supply. Solutions to current economic problems must rest upon the principles of inter-dependence of all countries, mutual support and shared responsibility, so that all countries, whatever their level of development, may be recognised as partners in the world economic system. Their continued economic and social development must be based upon world economic growth in conditions of stability and equity.

Ministers reiterated their determination that the Agency should contribute, as far as problems connected with energy were concerned, towards achievement of these objectives.

2. Ministers reviewed developments in the world energy situation since the establishment of the Agency on 15th November, 1974. They laid down guidelines and priorities for the Agency's future work and for the full implementation of the International Energy Program [IEP] and re-affirmed their commitment to work for the development of a co-operative multilateral relationship among oil producing and oil consuming countries.

3. They noted with approval that an emergency system has now been established to reduce oil consumption and to allocate oil supplies in conditions of shortage. This emergency system can be brought into operation at short notice if required, and will substantially reduce the economic effects of any future oil supply difficulties. They noted the importance of emergency reserves to insure the effectiveness of the emergency system, and noted that the Governing Board would reach a decision by 1st July, 1975, as to the date by which these emergency reserves should be raised to 90 days supply.

4. Ministers noted the importance of the collection and analysis of information on the oil market in order to ensure greater understanding and transparency in international oil trade. They agreed that

the oil market information system should be promptly completed and evaluated.

5. Ministers confirmed their determination to begin the implementation of a programme on long-term co-operation on energy by 1st July, 1975, with a view to achieving the overall objectives of the Agency by making more efficient use of the world's limited available resources of energy in the interest of the world economy; by diversifying the sources of energy; and by reducing dependence on imported oil.

Ministers agreed that co-operation in the Long-Term Program, to be equitable and effective, should take into due consideration the specific economic and social conditions of Member countries. The program should ensure that the burdens and benefits deriving from joint efforts of participating countries are shared among them on an equitable basis, and that policies directed at achieving such a balance should be implemented within existing legislative and constitutional limitations. They further stressed that the overall efforts and undertakings of each participating country with respect to energy conservation, production of energy and research and development in the energy field should be regularly reviewed within the Agency.

6. Ministers noted with satisfaction the progress that has been made in the field of conservation, in particular through the adoption of a group conservation target for 1975.

Ministers decided that the work of the Agency should be actively continued, and agreed that governments of the participating countries would need to increase their efforts to ensure that the energy conservation objectives of the Agency are achieved.

Ministers laid down as priorities for future work:

—the consideration of conservation objectives for the group for 1976 and 1977;

—the establishment of medium-term goals for 1980 and 1985; and

—the intensification of individual country reviews to strengthen the effectiveness of conservation programmes.

7. The Ministers agreed on the need to elaborate a co-ordinated programme of co-operation for the accelerated development of alternative energy sources as provided in the decision already taken by the Governing Board, including in particular a commitment to increase, encourage and safeguard investment by general and specific measures.

The Ministers agreed that the Agency should initiate promptly an examination of the potential for expanded co-operation in the area of nuclear energy. This co-operation in all fields will be directed toward ensuring the development of this important alternative source of energy with due regard to safety and environmental conditions. Amongst other questions shall be discussed the availability of nuclear fuel and technology to meet the problems of safety and waste management.

On the basis of the above mentioned decision Ministers insisted on the importance of the establishment of co-operative projects in the research and development fields specified in the IEP Agreement, particularly coal and nuclear questions. In this connection, they agreed to build further upon the progress already achieved by the Agency in the area of energy research and development. They resolved that productive results in this area will require a sustained effort to develop concrete international co-operation. In support of this objective, they agreed that a special session of the Governing Board, with attendance by senior research and development officials, should be held in the Autumn of 1975 to complete the formulation of a research and development program.

8. Ministers reviewed the relations among oil producing and oil consuming countries, developing and developed alike. With this in view they were aware of important and pressing problems of the developing countries which are not directly related to energy, and they were determined that these should be tackled with political determination and within a reasonable time-frame. Ministers noted that the Council of the OECD meeting at Ministerial level on May 28th and 29th proposes to discuss the problems of development and of commodities, including foodstuffs, and expressed the hope that steps will be taken toward effective action for finding solutions to these problems. For its part, the Agency will do all within its competence to work for the solution of the problems of the developing countries, so far as they are concerned with energy.

Ministers noted that the Preparatory Meeting held in Paris from 7th–16th April, 1975, had provided an opportunity for full and serious discussion of the means of establishing closer relations among oil producing and oil consuming countries.

Ministers declared themselves ready to pursue discussions at any time and in any manner found mutually convenient, and reaffirmed their common willingness to continue the dialogue and to encourage initiatives directed towards further progress.

Ministers exchanged views on possible ways of pursuing the dialogue. They agreed to continue bilateral contacts with interested countries. They instructed their representatives in the Governing Board to address these questions as a matter of urgency, to co-ordinate their efforts to ensure that formal deliberations responsive to the interest of all countries concerned can be held as soon as possible, and to examine the manner in which the dialogue should be continued.

9. Ministers agreed that the work carried out in the Agency thus far has made an important contribution towards meeting the difficulties that have been encountered in the energy field. They stressed

the importance of the solidarity among the Member countries, and emphasised the need for an intensification and, wherever possible, a broadening of co-operative efforts undertaken in this area. Acting in its operational capacity, the Agency will continue to develop further its co-operative energy programme in order to improve the overall energy supply and demand situation, which is of vital importance to the further development of the world economy as a whole.

Secretary Kissinger Summarizes Results of Ministerial Meeting

Excerpt from Secretary Kissinger's remarks to a news conference in Paris, May 27, 1975.

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. . . We consider the progress that has been made in energy cooperation among the members of the IEA one of the most significant achievements of the recent period. It symbolizes the ability of the industrial democracies to work together on a common problem. They have laid a foundation of major accomplishment in a very brief period of time since the Washington Energy Conference of February 1974.

The meeting today and the American position at that meeting was designed to take stock of what has been achieved and to chart the course for the future. It outlined the American proposals—outlined the objectives in the field of conservation, the development of alternative sources, the emphasis on nuclear power, the joint efforts in research and development that we believe can be undertaken by the IEA in the immediate future and that must be undertaken if the objective conditions that produced the energy crisis are to be alleviated and, over a period of time, eliminated.

We believe that these objectives are within our capacity to achieve. An important aspect of our view and that of our colleagues in the IEA has to do with producer-consumer relations, and this has to be seen in the context of what we shall do at the OECD tomorrow, mainly to sketch a new and, we hope, constructive approach to the relationship between the industrialized countries and the developing countries.

With respect to the consumer-producer dialogue, we have proposed a means by which the stalemate of the last conference can hopefully be overcome, by which it is possible to have discussions on energy which take place concurrently with discussions on raw materials and development in probably different forums that are related to each other but where each works on its own schedule.

Together with the specific proposals that we have made with respect to raw materials previously and that we shall elaborate tomorrow, we hope that the possibility has been created for a constructive dialogue between consumers and producers on energy and between industrialized and developing countries on a local basis. This is the approach that the United States is putting forward, which we believe has the substantial support of our partners, and it offers hope for progress in the field of energy and, we hope, for a constructive dialogue with the developing countries.

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Consumer Cooperation

Secretary Kissinger's Chicago Speech

Excerpts from Secretary Kissinger's address, "The Energy Crisis: Strategy for Cooperative Action," delivered in Chicago, November 14, 1974.

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Consumer cooperation has been the central element of U.S. policy for the past year and a half.

In April 1973 the United States warned that energy was becoming a problem of unprecedented proportions and that collaboration among the nations of the West and Japan was essential. In December of the same year, we proposed a program of collective action. This led to the Washington Energy Conference in February 1974, at which the major consumers established new machinery for consultation with a mandate to create, as soon as possible, institutions for the pooling of effort, risk, and technology.

In April 1974 and then again this fall before the U.N. General Assembly, President Ford and I reiterated the American philosophy that global cooperation offered the only long-term solution and that our efforts with fellow consumers were designed to pave the way for constructive dialogue with the producers. In September 1974 we convened a meeting of the Foreign and Finance Ministers of the United Kingdom, Japan, the Federal Republic of Germany, France, and the United States to consider further measures of consumer cooperation. And last month President Ford announced a long-term national policy of conservation and development to reinforce our international efforts to meet the energy challenge.

In our view, a concerted consumer strategy has two basic elements:

—First, we must create the objective conditions necessary to bring about lower oil prices. Since the industrialized nations are the principal consumers, their actions can have a decisive impact. Determined national action, reinforced by collective efforts, can transform the market by reducing our consumption of oil and accelerating development of new sources of energy. Over time this will create a powerful pressure on prices.

—Second, in the interim we must protect the vitality of our economies. Effective action on conservation will require months; development of alternative sources will take years. In the meantime, we will face two great dangers. One is the threat of a new embargo. The other is that our financial system may be unable to manage chronic deficits and to recycle the huge flows of oil dollars that producers will invest each year in our economies. A financial collapse—or the threat of it—somewhere in the system could result in restrictive monetary, fiscal, and trade measures and a downward spiral of income and jobs.

The consumers have taken two major steps to safeguard themselves against these

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dangers by collaborative action.

One of the results of the Washington Energy Conference was a new permanent institution for consumer energy cooperation —the International Energy Agency (IEA). This agency will oversee a comprehensive common effort—in conservation, cooperative research and development, broad new action in nuclear enrichment, investment in new energy supplies, and the elaboration of consumer positions for the consumer-producer dialogue.

Equally significant is the unprecedented agreement to share oil supplies among principal consumers in the event of another crisis. The International Energy Program that grew out of the Washington Energy Conference and that we shall formally adopt next week is a historic step toward consumer solidarity. It provides a detailed blueprint for common action should either a general or selective embargo occur. It is a defensive arrangement, not a challenge to producers. But producing countries must know that it expresses the determination of the consumers to shape their own future and not to remain vulnerable to outside pressures.

The International Energy Agency and the International Energy Program are the first fruits of our efforts. But they are only foundations. We must now bring our blueprint to life.

To carry through the overall design, the consuming countries must act in five interrelated areas:

—First, we must accelerate our national programs of energy conservation, and we must coordinate them to insure their effectiveness.

—Second, we must press on with the development of new supplies of oil and alternative sources of energy.

—Third, we must strengthen economic security—to protect against oil emergencies and to safeguard the international financial system.

—Fourth, we must assist the poor nations whose hopes and efforts for progress have been cruelly blunted by the oil price rises of the past year.

—Fifth, on the basis of consumer solidarity we should enter a dialogue with the producers to establish a fair and durable long-term relationship.

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Let there be no doubt, the energy problem is soluble. It will overwhelm us only if we retreat from its reality. But there can be no solution without the collective efforts of the nations of North America, Western Europe, and Japan—the very nations whose cooperation over the course of more than two decades has brought prosperity and peace to the postwar world. Nor, in the last analysis, can there be a solution without a dialogue with the producers carried on in a spirit of reconciliation and compromise.

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Secretary Kissinger's Los Angeles Speech

Excerpts from Secretary Kissinger's address, "A New National Partnership," delivered in Los Angeles, January 24, 1975.

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Clearly, the energy crisis is the most pressing issue on the new agenda. In the American view, a permanent solution is possible based on the following principles.

The first imperative is solidarity among the major consumers. Alone, no consuming country, except possibly the United States, can defend itself against an oil embargo or a withdrawal of oil money. Alone, no country, except perhaps the United States, can invest enough to develop new energy sources for self-sufficiency. But if the United States acted alone, it would doom the other industrialized nations to economic stagnation and political weakness; this would soon undermine our own economic well-being. Only by collective action can the consuming countries

free their economies from excessive dependence on imported oil and their political life from a sense of impotence.

We have made important progress since the Washington Energy Conference met less than a year ago. Last November, the United States and 15 other countries signed an unprecedented agreement to assist each other in the event of a new oil emergency. That agreement commits each nation to build an emergency stock of oil; in case of a new embargo, each will cut its consumption by the same percentage and available oil will be shared. Thus, selective pressure would be blunted and an embargo against one would be an embargo against all.

Equally important, we have moved dramatically toward financial solidarity. Only last week, the major consuming nations agreed to create a solidarity fund of $25 billion, less than two months after it was first proposed by the United States. Through the creation of this fund, the industrial nations have gained significant protection against shifts, withdrawals, or cutoffs of funds from the petrodollar earners. The industrial countries will now be able to offset financial shifts of oil producer funds by loans to each other from the $25 billion mutual insurance fund. The United States considers this rapid and decisive decision for the creation of the solidarity fund to be of the greatest political and economic significance.

The second imperative is a major reduction in consumer dependence on imported oil. The safety nets of sharing and financial guarantees are important for the short term. But our long-term security requires a determined and concerted effort to reduce energy consumption—on the highways and in our homes, in the very style of our lives. Equally important will be a speedup in the development of alternative energy sources such as nuclear power, coal, oil shale, and the oil of the outer continental shelf, Alaska, the North Sea, and elsewhere.

Cooperative action among the consumer nations will reinforce our own efforts in this country. The International Energy Agency (IEA), created last year, and other countries acting in parallel with it, such as France, are responding to the crisis with substantial conservation programs of their own. And the United States will shortly propose to the IEA a large-scale collective program to develop alternative energy sources through price and other incentives to investors and through joint research and development.

Such policies will be costly and complex; some will be unpleasant and politically unpopular. But we face a choice: Either we act now, and decisively, to insure national self-sufficiency in energy by 1985, or we remain prey to economic disruption and to an increasing loss of control over our future. This, bluntly, is the meaning of President Ford's energy program which he laid before the Congress in his state of the Union message.

The third imperative is an eventual dialogue between consumers and producers. Ultimately the energy problem must be solved through cooperation between consumers and producers. The United States, as a matter of evident necessity, seeks such a dialogue in a spirit of good will and of conciliation. But just as the producers are free to concert and discuss among themselves, so too are the consumers.

A principal purpose of consumer cooperation will be to prepare substantive positions for a producer dialogue to insure that it will be fruitful. The consumer nations should neither petition nor threaten. They should be prepared to discuss the whole range of issues of interdependence: assured supplies, a fair return to the producers of a depleting resource, security of investment, the relationship between oil and the state of the world economy.

Over the long term, producers and consumers, developed and developing nations, all depend on the same global economic system for the realization of their aspirations. It is this system which is now in jeopardy, and therefore the well-being of all nations is threatened. We must—together and in a cooperative spirit—restore the vitality of the world economy in the interests of all mankind.

Though we are far from having overcome

the energy crisis, the outlines of a solution are discernible. The right course is clear, progress is being made, and success is well within our capacity. Indeed, the energy crisis which accelerated the economic difficulties of the industrial democracies can become the vehicle by which they reclaim control over their future and shape a more cooperative world.

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Secretary Kissinger's National Press Club Speech

Excerpts from Secretary Kissinger's address, "Energy: The Necessity of Decision," delivered in Washington, February 3, 1975.

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We and our partners in the International Energy Agency have been, for a year, pursuing strategy in three phases:

—The first phase is to protect against emergencies. We must be prepared to deter the use of oil or petrodollars as political weapons, and if that fails, we must have put ourselves in the best possible defensive position. To do this, we have established emergency sharing programs to cope with new embargoes and created new mechanisms to protect our financial institutions against disruption. This stage of our common strategy is well on the way to accomplishment.

—The second phase is to transform the market conditions for OPEC oil. If we act decisively to reduce our consumption of imported oil and develop alternative sources, pressure on prices will increase. Measures to achieve this objective are now before the International Energy Agency or national parliaments; we expect to reach important agreements on them before the end of March.

—Once the consumer nations have taken these essential steps to reduce their vulnerability, we will move to the third stage of our strategy: to meet with the producers to discuss an equitable price, market structure, and long-term economic relationship. Assuming the building blocks of consumer solidarity are in place, we look toward a preparatory meeting for a producer-consumer conference before the end of March.

Our actions in all these areas are interrelated. It is not possible to pick and choose; since they are mutually reinforcing, they are essential to each other. No emergency program can avail if each year the collective dependence on OPEC oil increases. New sources of energy, however vast the investment program, will be ineffective unless strict measures are taken to halt the runaway, wasteful growth in consumption. Unless the industrial nations demonstrate the political will to act effectively in *all* areas, the producers will be further tempted to take advantage of our vulnerability.

In recent months we and our partners have taken important steps to implement our overall strategy. Two safety nets against emergencies have been put in place. In November, the IEA established an unprecedented plan for mutual assistance in the event of a new embargo. Each participating nation is committed to build an emergency stock of oil. In case of embargo, each nation will cut its consumption by the same percentage, and available oil will be shared. An embargo against one will become an embargo against all.

And in January, the major industrial nations decided to create a $25 billion solidarity fund for mutual support in financial crises—less than two months after it was first proposed by the United States. This mutual insurance fund will furnish loans and guarantees to those hardest hit by payments deficits, thus safeguarding the international economy against shifts, withdrawals, or cutoffs of funds by the producers.

The next steps should be to accelerate our efforts in the conservation and development of new energy sources. Action in these areas, taken collectively, will exert powerful pressures on the inflated price. No cartel is so insulated from economic conditions that its price structure is invulnerable to a transformation of the market. Because of the reduced consumption in the past year, OPEC has already shut down a fourth of its capacity, equaling 9 million barrels a day, in order to keep the price constant. New oil exploration, accelerated by the fivefold-higher price, is constantly discovering vast new reserves outside of OPEC. The $10 billion in new energy research in the United States—on the scale of the Manhattan project and the moon-landing program—is certain to produce new breakthroughs sooner or later.

As the industrialized nations reduce consumption and increase their supply, it will become increasingly difficult for OPEC to allocate the further production cuts that will be required among its members. Even now, some OPEC members are shaving prices to keep up their revenue and their share of the market. Indeed, it is not too soon in this decade of energy shortages to plan for the possibility of energy surpluses in the 1980's.

The strategy we have been pursuing with our partners since the Washington Energy Conference has linked our domestic and international energy policies into a coherent whole. We have made remarkable progress, but much remains to be done. The question now is whether the industrialized countries have the will to sustain and reinforce these promising initiatives. Conservation and the development of new sources of energy are the next priorities on our common agenda.

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Consumer solidarity is not an end in itself. In an interdependent world, our hopes for prosperity and stability rest ultimately on a cooperative long-term relationship between consumers and producers.

This has always been our objective. It is precisely because we wish that dialogue to be substantive and constructive that we have insisted that consumers first put their own house in order. Collective actions to restore balance to the international economic structure, and the development in advance of common consumer views on the agenda, will contribute enormously to the likelihood of the success of the projected consumer-producer dialogue. Without these measures, discussions will only find us restating our divisions and tempt some to seek unilateral advantages at the expense of their partners. The result will be confusion, demoralization, and inequity, rather than a just reconciliation between the two sides.

A conciliatory solution with the producers is imperative, for there is no rational alternative. The destinies of all countries are linked to the health of the world economy. The producers seek a better life for their peoples and a future free from dependence on a single depleting resource; the industrialized nations seek to preserve the hard-earned economic and social progress of centuries; the poorer nations seek desperately to resume their advance toward a more hopeful existence. The legitimate claims of producers and consumers, developed and developing countries, can and must be reconciled in a new equilibrium of interest and mutual benefit.

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Secretary Kissinger's Statement on Domestic and International Energy Policy

Statement by Secretary Kissinger before the Subcommittee on Energy of the Joint Economic Committee of the Congress, September 19, 1975.

The events set in motion by the October 1973 war exposed the dangerous vulnerability we had incurred as a result of our growing dependence on imported oil. The oil embargo and the series of massive oil price increases which followed underscored the degree to which we had lost control over the price of a central element of our economic system. We also found that our own economic well-being and security were threatened by the energy vulnerability of our allies and that the escalating price of energy had wreaked havoc on the programs of developing countries.

Over the past two years our objective has been to develop a comprehensive strategy to end our domestic and international energy vulnerability. Our goal has been to build a series of policies which would:

—Protect us against short-term dangers such as embargoes and the destabilizing movements of assets held by oil countries;

—Provide support for developing countries hard hit by high oil prices;

—Make possible a return to noninflationary growth, and

—Create the political and institutional conditions for a productive dialogue between consumer and producer countries.

We have made substantial progress in meeting the immediate crisis.

We and our partners in the International Energy Agency (IEA) have joined in a plan for mutual assistance in the event of a future embargo. In April we and other industrialized countries agreed on a $25 billion support fund to offset abrupt or predatory shifts of funds by OPEC [Organization of Petroleum Exporting Countries] as well as balance-of-payments problems. Also at our initiative, the International Monetary Fund will create a special Trust Fund for concessional loans to developing countries hit hardest by oil price increases. We have also coordinated closely with Germany, France, Japan, and Britain to restore sustained economic expansion in the industrial world.

Despite this progress much remains to be done if we are to overcome the impact of the energy crisis.

Here at home we must move rapidly in reducing our dependence on imported oil. Our present vulnerability will continue, and indeed increase, unless we intensify our conservation efforts and promptly initiate those programs and policy measures which will insure the availability of major amounts of new energy by the end of this decade and into the 1980's.

For the short term we look to conservation as the primary means of reducing our import dependence. In this regard, the decontrol of domestic oil prices is the single most important conservation measure we can take.

But there should also be other elements in our domestic energy policy, including the deregulation of natural gas, as well as the accelerated exploration of potential resources in Alaska and on the outer continental shelf.

We cannot succeed alone in this effort. We must work closely with other major consuming countries if we expect to end the monopoly power of the producer countries in unilaterally setting oil prices.

We and our IEA partners are now developing a comprehensive program of long-term cooperation. In the conservation area we will set overall targets based on equitable burden sharing among members, and we will verify each other's performance.

To accelerate the development of new energy, IEA members must pool their resources and expand research and development efforts. To cover the massive development costs, IEA countries must work together to insure that the necessary financial resources will be available.

It is also important that we establish a common basis for developing alternative supplies by agreeing that none of the IEA countries will permit imported oil to be sold in our economies below a certain minimum price

level. The object of this element of consumer policy is to assure that our efforts are not disrupted by predatory pricing by OPEC and to protect those countries that invest heavily in higher cost energy from being put at a competitive disadvantage if the oil producers engage in predatory pricing.

These efforts by the United States and its IEA partners are extremely important, for without serious joint effort by the consumer countries our credibility will be questioned and no balanced dialogue with producer countries will be possible. We seek such a dialogue with the producing countries, one that will underscore our mutual interests rather than our differences. If we and our IEA partners seek reliable access to oil supplies at stable prices, the producing countries also seek secure outlets for their growing assets and greater participation in the world financial and economic system.

We have worked hard to launch a productive dialogue on energy, raw materials, development, and finance. We look forward to the meetings on these subjects which will begin next month. They offer an opportunity for consumer and producer countries alike to demonstrate their ability to create new ties and relationships.

A major test of the producer country commitment to a more positive relationship will occur in the next few days when OPEC countries meet to decide whether or not to extend their own moratorium on oil price increases. After the dramatic price increases of the past two years another oil price rise can only endanger the positive dialogue which we all seek. It will affect the expansionary policies of industrialized countries. It will further weaken the economies of the developing countries, so many of which are already in precarious condition. It could also result in the stagnation of OPEC oil exports and lead to demands for yet higher oil prices. Such a series of events is in the interest of no one and can only jeopardize our hopes for a new and constructive relationship.

Regardless of the decisions of the oil producers, the United States must regain control of its own economic future. Our leadership role in the world demands that we demonstrate our national resolve to overcome the problems we face and our determination not to entrust our political and economic destiny to others.

Consumer-Producer Dialogue

Martinique Communique

Excerpt from the Communique issued at the conclusion of meetings between the President of the United States and the President of the French Republic in Martinique, December 16, 1974, in which they called for a conference of oil producers and consumers.

The President of the United States, Gerald R. Ford, and the President of the French Republic, Valéry Giscard d'Estaing, met in Martinique December 14–16, 1974, to discuss current issues of mutual concern. They were joined in their discussions by the Secretary of State and Assistant to the President for National Security Affairs Henry A. Kissinger and Minister of Foreign Affairs Jean Sauvagnargues, and by Secretary of the Treasury William Simon and Minister of Finance Jean-Pierre Fourcade. The Ministers also held complementary side talks.

The meeting took place in an atmosphere of cordiality and mutual confidence. President Ford and President Giscard d'Estaing welcomed the opportunity to conduct detailed substantive discussions on the whole range of subjects of mutual concern. As traditional friends and allies, the two nations share common values and goals and the two Presidents expressed their determination to cooperate on this basis in efforts to solve common problems.

They reviewed the international situation in the economic, financial and monetary fields.

The two Presidents agreed that the Governments of the United States and of the European Community, in the name of which the French President spoke on this subject, must adopt consistent economic policies in order to be effective in avoiding unemployment while fighting inflation. In particular, they agreed on the importance of avoiding measures of a protectionist nature. And they decided to take the initiative in calling additional intergovernmental meetings should they prove necessary for achievement of the desired consistency of basic economic policies among industrial nations.

In the light of the rapid pace of change in international financial positions in the world today, the Presidents were in full agreement on the desirability of maintaining the momentum of consideration of closer financial cooperation both within the International Monetary Fund and through supplementary measures. As one specific measure to strengthen the existing financial framework, the Presidents agreed that it would be appropriate for any Government which wished to do so to adopt current market prices as the basis of valuation for its gold holdings.

The two Presidents considered in depth the energy problem and its serious and disturbing effects on the world economy. They recognized the importance for the USA, the EEC and other industrialized nations of implementing policies for the conservation of energy, the development of existing and alternative sources of energy, and the setting up of new mechanisms of financial solidarity. They stressed the importance of solidarity among oil importing nations on these issues.

The two Presidents also exchanged views on the desirability of a dialogue between consumers and producers and in that connection discussed the proposal of the President of the French Republic of October 24 for a conference of oil exporting and importing countries. They agreed that it would be desirable to convene such a meeting at the earliest possible date. They regard it as important that all parties concerned should be better informed of their respective interests and concerns and that harmonious relations should be established among them in order to promote a healthy development of the world economy.

The two Presidents noted that their views on

these matters are complementary and, in this context, they agreed that the following interrelated steps should be taken in sequence:

—They agreed that additional steps should be taken, within the framework of existing institutions and agreements to which they are a party, and in consultation with other interested consumers, to strengthen their cooperation. In particular, such cooperation should include programs of energy conservation, for the development of existing and alternative sources of energy and for financial solidarity.

—Based on substantial progress in the foregoing areas, the two Presidents agreed that it will be desirable to propose holding a preparatory meeting between consumers and producers to develop an agenda and procedures for a consumer/producer conference. The target date for such a preparatory meeting should be March 1975.

—The preparatory discussions will be followed by intensive consultations among consumer countries in order to prepare positions for the conference.

The two Presidents agreed that the actions enumerated above will be carried out in the most expeditious manner possible and in full awareness of the common interest in meeting this critical situation shared by the United States and France and all other countries involved.

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U.S. Opening Statement at Preparatory Meeting

Statement by Charles W. Robinson, Under Secretary for Economic Affairs, head of the U.S. delegation to the Preparatory Meeting for the proposed conference of oil producers and consumers in Paris, April 7–15, 1975.

The United States is pleased to participate in this preparatory meeting for the international conference on energy and related economic problems, which initiates an important—in fact an essential—dialogue between oil producer and consumer countries. We congratulate the Government of France for its initiative and express our appreciation for its efforts in convening this meeting today. We also extend thanks for the generous hospitality which is being extended to those of us fortunate enough to be invited to Paris in April.

There have been various analyses and interpretations of the oil crisis that began in the autumn of 1973. There are clearly differences of view among us, which will be discussed in the conference that we will be organizing at this preparatory meeting, but there are also many areas of common interest to which we will need to devote our primary efforts.

I believe that we can agree on at least two things.

First, the quintupling of oil prices over the past two years, although posing problems for the world economy, has heightened awareness of the interdependence of nations.

Second, the problems emanating from the current oil situation cannot be resolved through confrontation or by unilateral action, but only through cooperative efforts among all major parties.

We all share a common concern that the social and economic well-being of our peoples be enhanced rather than retarded, that developing nations be able to look forward to their rapid development rather than have their prospects undermined, and that the international financial and trading system be responsible enough and strong enough to cope with new stresses and meet our common needs.

In calling the Washington Energy Conference a little more than a year ago, we made clear from the outset that the initial discussion among the major industrialized importers of oil was only a first step toward the necessary dialogue between both consumers and producers of oil.

At the conclusion of the Washington Conference, ministers of the major industrialized countries stated their recognition of the "need to develop a cooperative multilateral relationship with producing countries, and other consuming countries that takes into account the long-term interests of all."

Returning to this theme in February, one year later, Secretary Kissinger stated that:

> In an interdependent world, our hopes for prosperity and stability rest ultimately on a cooperative long-term relationship between consumers and producers.
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> . . . . .
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> The producers seek a better life for their peoples and a future free from dependence on a single depleting resource; the industrialized nations seek to preserve the hard-earned economic and social progress of centuries; the poorer nations seek desperately to resume their advance toward a more hopeful existence.

A year has passed since the Washington Conference. In that time, energy problems and the inflation and recession to which they have contributed have adversely affected large numbers of people throughout the world. We and other like-minded consumer nations have agreed on a series of collective measures to enable our economies and the world economy to meet the problems associated with the increased price of oil. We sought the consumer cooperation that we considered necessary to insure a substantive and constructive dialogue. The International Energy Agency, present today as an observer, was established last November in recognition that a degree of consumer solidarity had been achieved and to serve as the institutional vehicle for the further elaboration of necessary cooperative measures.

Our purpose at this preparatory meeting is to organize the procedures for the conference that will build on the dialogue initiated at this meeting. Toward this end, we need to strike a balance between the immense scale and complexity of the world energy problem on the one hand and the constraint of realistic expectations for concrete results on the other. It is certainly true that today we are living in a highly interdependent world economy. The countries of the world have an interest in many economic issues in addition to the international oil situation. But if we are to have a conference with a reasonable expectation of tangible results, we must set bounds as to what such a meeting is designed to achieve. We must therefore consider carefully the scope of both the agenda and participation of the conference.

With regard to the agenda, we are here, in the words of the invitation received from the President of the French Republic, to organize a conference "to examine the energy problems to which many aspects of international economic relations are linked." The social, economic, and political dimensions of this problem are enormous, and the characteristics of the relations between producers and consumers of oil are in many respects unique. Our discussions are bound to overlap at times with other aspects of the world economy, and due account must be taken of such linkages. But I feel strongly that the work program to be developed here should be concentrated on the specifics of energy and related matters and not become diluted with parallel discussions of other issues, however important they may be.

I say this recognizing that oil is only one of the major commodities traded on world markets and that, indeed, all commodities are interrelated within the world trade and financial system. We recognize the need for imaginative new initiatives in this area and are indeed prepared to discuss these other issues elsewhere in appropriate fora, and I take particular note of the upcoming special session of the U.N. General Assembly in September. The point I wish to make here is simply that we have more than enough to handle with the energy-related problems in the effort we are initiating today. To broaden the scope of our discussions would substantially decrease the likelihood of a productive outcome.

As for the number of participants in the main conference, we would foresee a reasonable limitation in participation, but with

balanced representation of industrialized consumer countries, developing consumer countries, and the oil-exporting countries. The total number should be sufficiently restricted to permit constructive discussions but large enough that all interests are adequately represented.

It will obviously be impossible for us in this preparatory meeting to designate in a specific manner the participants in the eventual main conference. However, we can concentrate on developing procedures under which participants can be designated in the period between the end of this meeting and the convening of the full conference.

In conclusion, we are initiating a process of vital and far-reaching concern to the international economy. The people of our nations and of other nations expect and deserve constructive results from this process. We must respond with determination and imagination and take the initial steps at this meeting toward more harmonious relationships in energy and related economic fields.

I pledge the best efforts of the U.S. Government to that end.

U.S. Closing Statement at Preparatory Meeting

Statement by Thomas O. Enders, Assistant Secretary for Economic and Business Affairs, at the conclusion of the Preparatory Meeting of the proposed conference of oil producers and consumers in Paris, April 15, 1975.

I wish to express appreciation to the Government of France for acting as host at this preparatory meeting, on behalf of Under Secretary Robinson, the U.S. delegation, and myself. It has provided a useful opportunity for an exchange of views among industrialized countries, oil-exporting nations, and developing countries on a range of subjects of mutual interest. The meetings have proceeded constructively, and there has been a genuine desire to understand and appreciate respective points of view.

We are disappointed that we have not been able to complete the arrangements necessary for the convening of a formal conference. We have agreed to return to our capitals to consider various points of view which have been discussed in considerable detail over the past nine days. We will remain in contact through appropriate channels to resume together preparations for a conference as quickly as possible.

As you are aware, the major subject of discussion during the last several days has been the proposed draft agenda for a full conference. I do not believe it useful to comment in detail on the various issues involved in these discussions. There has been a basic difference of view with regard to the scope and objectives of the proposed conference.

We were, of course, invited here by the President of the French Republic to prepare for a conference on energy and energy-related issues. We came here ready to discuss these issues, which are of central concern to all countries. Others have insisted on a much broader conference, extending to all aspects of the relationship between the industrialized countries and the developing world.

We have been and will continue to be willing to discuss seriously raw materials and other development issues in forums more directly concerned with them and to attempt therein to seek mutually beneficial solutions. However, we believe that the proposed conference could achieve constructive results only if it were focused on a relatively limited rumber of points related to the central subject of energy.

I would like to stress that the discussions of the past nine days have taken place in an atmosphere of cordiality, and genuine attempts have been made to understand respective points of view. In this sense we must all consider this meeting has not been a failed

effort. The United States attaches great importance to its exchanges with each of the countries represented at this meeting. Our intention is to continue our efforts to promote cooperation with them through all channels.

Results of Preparatory Meeting

Statement by Charles W. Robinson, Under Secretary for Economic Affairs, before the Subcommittee on International Resources, Food, and Energy of the House International Relations Committee, May 1, 1975, in which he discusses the breakdown of the Preparatory Meeting in Paris.

I am pleased to have this opportunity to appear before your subcommittee to provide testimony on the recently concluded preparatory meeting between oil producing and consuming nations and to discuss in broad terms the relationship of this meeting with our overall energy policy.

At the Washington Energy Conference in February 1974, the United States and 12 other industrialized nations agreed that, at the appropriate time, they should meet with developing consumer states and producing countries to explore possibilities for mutually acceptable solutions to the energy problem. The International Energy Agency (IEA), created nine months later, has as one of its goals the institution of contacts and dialogue with the producing nations.

We realized, however, that meaningful discussions could take place only after consuming nations had proved that they would not remain helpless over time to the arbitrary manipulation of the world oil market by the OPEC [Organization of Petroleum Exporting Countries] states. Before we could negotiate effectively, or even gain the necessary respect for serious discussions, we had to undertake unified actions in the energy field that would demonstrate strength and consistency of purpose.

Consequently, our international energy efforts since the Washington Energy Conference have concentrated on the creation of a framework of close consumer-country cooperation. Through this effort, we seek to reduce, and eventually eliminate, our vulnerability to manipulation of our oil supply and oil prices.

Substantial progress has been made in building consumer solidarity over the past 14 months. In the IEA, we have agreed on emergency provisions that will enable a unified and coordinated response to any future embargo. Along with other OECD [Organization for Economic Cooperation and Development] countries, we have agreed to create within the OECD a $25 billion support fund to act as a lender of last resort to industrialized countries suffering severe balance-of-payments costs because of high oil prices.

These efforts, basically short-term insurance policies, are complemented by essential longer term programs to reduce IEA members' collective dependence on imported oil. We have established as a conservation target the reduction of IEA oil imports by 2 million barrels a day by the end of 1975, and similar objectives will be established for later years. We have agreement in principle on a series of interrelated measures to accelerate the development of indigenous energy supplies; it is anticipated that implementation programs will be developed and approved by July 1.

The Paris preparatory meeting of April 7–15, or "Prepcon," took place as a result of a French initiative. Last fall the French President proposed a meeting of a small number of industrialized, developing, and producing countries in Paris to plan a multilateral conference on energy; invitations to such a meeting were issued in March. The French proposal was similar to one made earlier by Saudi Arabian Petroleum Minister [Ahmad Zaki] Yamani, and the French in-

vited the same countries to the Prepcon that Minister Yamani had originally proposed. The Shah of Iran had also shown interest in a producer-consumer conference.

In December at Martinique, President Ford conditioned the participation of the United States in a producer-consumer conference on a sequential four-stage approach, which the IEA subsequently endorsed. In the first stage, consumer cooperation would be strengthened in the areas of finance, conservation, and accelerated development of energy; as I mentioned earlier, concrete programs in these areas have been agreed to. The second stage was to be the Prepcon. Stage 3 would involve intensified consumer cooperation and the development of common consumer positions. Stage 4 would be the holding of the conference. In the light of progress made toward consumer solidarity, we agreed in late March to proceed with the preparatory meeting.

Issues Discussed at Preparatory Meeting

The task of the Prepcon was to agree on the procedures and participants for the energy conference to be held later this year. The 10 participants included representatives from the industrialized countries (the United States, Japan, and the nine members of the European Community represented through a single spokesman), the developing consumer countries (Brazil, India, and Zaïre), and the OPEC nations (Saudi Arabia, Iran, Venezuela, and Algeria). As host, France, which has declined to join the IEA, provided the "technical chairman"; the French were also represented in the European Community delegation.

We went to Paris determined to be cooperative and constructive. We believed that the conference should be one in which rhetoric was minimized and real work toward concrete solutions was maximized. Therefore it was essential, in our view, to have an agenda for the conference that was manageable in size and which offered the promise of real progress.

Despite nine days of intense and grueling negotiations, the 10 delegations at the Prepcon could not reach agreement on the procedural issues for the conference. The talks failed to resolve the fundamental question of what type of conference it would be. The United States, the European Community, and Japan, unanimously supported by other members of the IEA, maintained that the conference should focus on energy and energy-related matters as proposed in the French invitation. The OPEC and LDC [less developed countries] representatives were willing for the conference to discuss energy but only if equal status were given to a wide range of problems relating to the economic relations between developing countries and the rest of the world. Specifically, they insisted that the conference treat raw materials, monetary reform, and assistance to most seriously affected countries on the same basis as energy.

The industrialized countries demonstrated considerable flexibility in the negotiations, offering to interpret quite broadly the topics that could be considered under the general energy rubric. We offered in addition to treat all non-energy-related subjects in other appropriate fora where work on them was already underway. We were not willing, however, to agree, as the OPEC and LDC representatives seemed to want, to create another unproductive forum to discuss the "new international economic order."

Even though the talks adjourned because of disagreement over this basic issue, several other issues were left undecided. The OPEC and LDC representatives sought specific agenda references to maintaining the purchasing power of export earnings and the real value of investments; i.e., indexation of prices and investments. We argued that we could not accept such references since they prejudged the outcome of the conference. We said, however, that we were prepared for them to raise these subjects for discussion at the conference under an agenda formulation that was neutrally cast. Since the Prepcon's mandate was only procedural, we did not attempt to engage in substantive debate over indexation.

Spearheaded by Algeria, the OPEC and LDC states also opposed IEA attendance as an observer at the full conference. They maintained that IEA is a confrontational

organization whose existence is not recognized by the OPEC nations. They argued that the presence of the IEA would give the conference too much of an energy orientation and that OECD presence at the conference should suffice for IEA representation. With unanimous support from other IEA members, the United States, the European Community, and Japan were prepared to condition their attendance at the conference, and acceptance of any agreed agenda, on IEA presence as an observer with the right to speak. We believed that to agree on IEA exclusion would be to accept implicitly the confrontational charge. Furthermore, IEA exclusion would prevent representation at the conference (via IEA) of many important consuming countries. This issue was not settled before the conference adjourned.

Let me note parenthetically that it was clear early in the first week that compromise on these fundamental differences was unlikely. Nevertheless the participants continued their negotiations for several extra days and nights in order to explore all possibilities for accommodation. The adjournment of the Prepcon was not accompanied by recrimination among the participants.

Major Conclusions Drawn From Meeting

Mr. Chairman, it is not correct, I think, simply to characterize the Prepcon as a failure. It is true that the main purpose of the meeting was not achieved. On the other hand, all participants gained a much greater appreciation of the others' views which may have a salutary effect on future bilateral and multilateral relations.

What are the major conclusions we have drawn from the Prepcon?

First, the OPEC states have succeeded in linking their interests with those of the LDC's even though high oil prices are seriously damaging the economies of many developing nations. Some LDC nations unfortunately find attractive the idea that they can help solve their economic problems by following the OPEC example; i.e., cartelizing and demanding higher prices for all raw materials. We expect the OPEC–LDC bloc under OPEC leadership to be a strong and vocal force in future international fora, at least until developing countries come to recognize that widespread cartelization will be neither practical nor productive.

Second, the industrialized nations demonstrated strong consumer solidarity, proving the tremendous progress that has been made in the IEA over the past 14 months. During the Prepcon, we coordinated our positions closely with other IEA members. The decision to hold firm in insisting on an energy conference and on IEA participation received unanimous endorsement from the IEA Governing Board, which is composed of representatives from the 18 member countries.

Finally, it appears that the timing is not yet right for a multilateral dialogue on key energy issues. The producers at the Prepcon showed little willingness to engage in serious discussion on energy unless the industrialized nations would consider at the same time the broader issues of LDC relations.

Effect of Meeting on U.S. Energy Policy

We regret that the Prepcon did not succeed. We remain willing to participate in a multilateral conference if one can be arranged that concentrates on energy. But we do not expect our own energy policies to be affected in a major way by the suspension of the Prepcon talks.

Our overall energy policy, pursued both in the United States and in coordination with other IEA countries, will continue to be to bring about a basic shift in the supply-demand balance in the world oil market. This will reduce our vulnerability to foreign supply disruptions, reduce the ability of a small group of countries to manipulate world oil prices arbitrarily, and enable prices to approach their long-term equilibrium level.

The focus of our international efforts will remain in the IEA. We intend to insure that momentum is maintained as we press ahead to implement the conservation and accelerated-development programs.

The Prepcon proved that other IEA members share our belief in the necessity of consumer solidarity. They, too, believe the IEA has a key role to play in dealing with the energy problem. They will, we think,

work with us to insure that the IEA's importance and influence will increase in the future.

Given the leading role which the United States has played in the development of the International Energy Agency, it is most important that the United States accede to the Agreement on the International Energy Program without reservation. The United States is now applying the agreement provisionally pending adoption of the requisite implementing legislation by Congress. Unfortunately, the legislation currently under consideration in the House of Representatives would not permit us to adhere to the International Energy Program without reservation. Specifically, this legislation does not fully meet vital IEA requirements relating to demand restraint; that is, conservation, the allocation of petroleum in case of another embargo, and the establishment of a petroleum reserve. The antitrust provisions of the legislation under consideration are also deficient. While this subcommittee is not immediately concerned with this legislation, may I take this opportunity to urge you and your colleagues in the House to make every effort to promptly approve legislation which will permit the United States to accede to the Agreement on the International Energy Program.

In the months ahead, we will also seek to intensify our cooperative bilateral relations with producing governments. We have many common interests which provide important opportunities to work together. For instance, our joint commissions with Saudi Arabia and Iran are making significant progress in identifying key areas for cooperation. As we build on and broaden the scope of our activities with these two producers and with other OPEC states, we will create in time a set of economic and political relationships that should enable us to help them achieve important national goals and to appreciate more fully their responsibility for pursuing oil policies that lend stability to the international economy.

We are convinced, Mr. Chairman, that the oil crisis will not simply go away. Our policies are designed to meet the challenge of that crisis. They will, if properly and vigorously pursued, permit us to achieve our two fundamental objectives: an international price of oil set by free market forces and substantial U.S. self-sufficiency in energy.

U.S. Calls for Resumption of Consumer-Producer Dialogue

Excerpts from Secretary Kissinger's address, "Strengthening the World Economic Structure," delivered in Kansas City, May 13, 1975.

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It is in energy that the challenge to the economic system has been the most effective and has had the most severe impact.

For years the United States and other industrial countries built their prosperity on ever-increasing imports of inexpensive foreign oil. Now we see that both the price and availability of those supplies can be determined by decisions over which we have no influence. Our jobs, our output, our future prosperity, are at risk.

In response, at U.S. initiative, 18 major industrial countries created the International Energy Agency (IEA) to coordinate our efforts in a common strategy.

Our first responsibility was to protect ourselves against emergencies. We have to be prepared to deter the use of oil or petrodollars as political weapons or to defend ourselves if we are given no choice. To this end, we and our partners have developed a comprehensive plan to build up oil stocks, coordinate conservation measures, and share available supplies in the event of a new embargo. We have also agreed on a $25 billion "financial safety net" to protect against the stresses of large oil deficits and possible financial manipulation.

The second objective of the strategy is to bring pressure on the oil price through the market. If we act decisively to reduce the consumption of imported oil and develop alternative sources, we will sharply reduce demand. The producers can restrict production to maintain high prices and allocate the cuts among them, but at some point the severe decrease in demand will become a burden on those countries who seek maximum revenue for development.

Accordingly, we and our partners first set joint conservation goals. We then reached preliminary agreement on a plan to stimulate alternative sources. The plan calls for cooperation in research and development and a common minimum price mechanism to protect domestic alternative energy sources from competition from imported oil. The ministers of the International Energy Agency meet later this month to accelerate the common effort. We shall propose ways to exploit our greatest asset—our technological capability and skill, particularly in the development of alternative energy sources.

In the end the key to the international effort will be what America does. We use fully half of the industrial world's energy. If we bring our consumption under control, so will other industrial countries. Indeed, other countries are already ahead of us in adopting new taxes and other programs to curb energy use. But if we do not act now, while recession is holding down demand for oil, our vulnerability will grow again when our recovery gains momentum.

The choice is clear: either we pass now an effective program of energy conservation and energy development or we become dependent on foreign sources for half our oil within a few years and correspondingly vulnerable to political pressures or manipulation.

The Congress has before it President Ford's energy program. Its decision is therefore critical to our future well-being and that of the international community.

Ultimately, producers and consumers of energy must develop a new and balanced relationship. A first attempt at dialogue at the preparatory meeting called by President Giscard d'Estaing [of France] in April did not succeed.

The United States wants to say now that it is prepared to attend a new preparatory meeting. We believe that the meeting should be prepared through bilateral contacts between the consumers and producers. The United States will initiate such contacts with its partners in the IEA, with the Government of France, and with the producers. Our own thinking on the issue of raw materials, and the manner in which it can be addressed internationally, has moved forward. We can thus resume the dialogue in a new atmosphere.

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French Aide Memoire for Second Preparatory Meeting

Aide Memoire attached to the letter of invitation to the Second Preparatory Meeting to be held in Paris, October 13–16, 1975, outlining the consensus which had been reached among the 10 participants on the purpose of the meeting.

1.1. It has been agreed that the questions to be discussed during the dialogue between industrialized countries and developing countries are energy, raw materials and the problems of development, including all related financial questions.

1.2. These questions will be dealt with on equal footing. The participants in the dialogue will in particular spare no effort to advance toward constructive solutions on each of these subjects.

2.1. A new preparatory meeting will be held in Paris at as early a date as possible, and no later than October 15, comprising the same members, at the same level and in accordance with the same rules of procedure (particularly as regards observers) as the preparatory meeting last April.

2.2. The name of this meeting will be: "Preparatory meeting for the conference between industrialized countries and developing countries" or "Prepar-

atory meeting for the conference on international economic cooperation".

2.3. The task of the preparatory meeting will be:

—To confirm the consensus reached at the April preparatory meeting on the convening of a limited but representative conference, on the number of its participants and on the procedure for their selection.

—To submit to the conference proposals on the setting up of commissions and their composition (members and observers).

2.4. The preliminary meeting should be prepared in such a way that it reaches a consensus within no more than two to three days.

3.1. The preparatory meeting will be followed up, within a maximum of two months, by the conference itself. The conference will comprise 27 members, eight from the industrialized countries and 19 from the developing countries. Each of these two groups will select its representatives to the conference within one month after the preparatory meeting.

3.2. The conference will open at the ministerial level. In order to ensure the actual participation of all the ministers, it would be preferable that its duration does not exceed three days.

3.3. The essential task of the conference will be to decide on the proposals to be submitted for its approval by the preparatory meeting.

3.4. This should induce it to set up four commissions, corresponding to the themes of the dialogue, to determine their composition, to set general guidelines for them within the framework of paragraphs 4.3. to 4.6. inclusive and to agree on what follow-up their work should have.

4.1. These commissions will not have more than 15 members. In determining its representation in each commission, each of the two groups at the conference will choose from among its members, those who, because of their special interest and the overall significance of their participation seem best suited to take part in order that the work may be carried out in an effective and responsible manner. The chairmanship of each of the commissions will be assumed by two co-chairmen designated by each of the two groups respectively.

4.2. The commissions will be composed of high-level experts representing their government.

4.3. The commission on energy, within the framework of an overall study of prospects for energy production and consumption in the world, including hydrocarbons, will be entrusted with facilitating through suitable ways and means the arrangements between oil producers and consumers which may seem advisable.

4.4. The commission on raw materials, through suitable ways and means and taking the existing situation into account, will be entrusted with facilitating the arrangements which may seem advisable in the area of raw materials—including food products—which are of particular interest to the developing countries.

4.5. The commission on development, through suitable ways and means and taking the existing situation into account, will be entrusted with facilitating the arrangements which may seem advisable in the area of cooperation for development.

4.6. The commission on financial affairs, while respecting the jurisdiction of international institutions (IMF, World Bank) will study all financial problems, including their monetary aspects, related to the work of the three preceding commissions. It will be composed of an appropriate number of members from each of these three commissions.

4.7. The commissions on raw materials and development will, in particular, take into consideration the work carried out by other appropriate international bodies and will establish the necessary contacts with these groups.

4.8. Joint meetings of the co-chairmen of these commissions may be planned if the need arises.

4.9. Observers from organizations which are directly concerned with the problems being discussed will be able to attend the commissions and will have the right to speak.

5.1. The conference will meet again at the ministerial level in about 12 months.

5.2. One or several meetings of the conference at the level of government officials may possibly be held at least six months after the first meeting of the conference at the ministerial level.

Second Preparatory Meeting Declaration

Final Declaration adopted by the Second Preparatory Meeting, October 16, 1975.

PARIS, *16 October 1975.*

1. The participants in the Preparatory Meeting for the international Conference proposed by the President of the French Republic, which was held in Paris from 7 to 15 April 1975, met again at the International Conference Centre from 13 to 16 October 1975 under the technical chairmanship of Mr. de Guiringaud, Ambassador of France, with a view to pursuing preparation for the dialogue on energy, raw materials, problems of development, including all related financial questions.

2. The ten delegations confirmed the agreement of their authorities on the convening of an international conference on these questions. They decided that the Conference will be called the "Conference on International Economic Co-operation", that it will be held in Paris, that it will be composed of 27 members designated as indicated below, and that it will be convened at ministerial level on 16 December 1975 for a session of two or possibly three days. The Secretary-General of the United Nations will be invited to the Ministerial Conference.

3. The European Economic Community, the United States and Japan, on the one hand, and the seven developing countries participating in the Preparatory Meeting (Algeria, Brazil, India, Iran, Saudi Arabia, Venezuela, Zaïre), on the other hand, will assume responsibility for the designation, from among their respective groups and according to the procedures which the industrialized countries and the developing countries, respectively, deem appropriate, of five industrialized countries and twelve developing countries, to be added to the present participants so as to bring to twenty-seven the number of participants in the Conference. The French Government will be notified, within a period which should not exceed one month, of the list thus established of the delegations to be invited to the Ministerial Conference.

4. The ten delegations also decided that the Conference should have two co-chairmen chosen respectively by each of the two participating groups from among its members, and that they should preside alternately over the meetings in a manner to be agreed between them. The participants in the Preparatory Meeting recommend that the two co-chairmen should be designated as soon as possible after the lists of participants in the Conference have been completed, and they suggest that the two co-chairmen should begin, immediately after being designated, to take together all necessary steps, in liaison with the host country, to ensure that the Ministerial Conference proceeds satisfactorily.

5. The Preparatory Meeting proposes to the Ministerial Conference that it set up a commission for energy, a commission for raw materials, a commission for development and a commission for financial affairs. Each of these commissions should consist of fifteen members, ten of them representing developing countries and five representing industrialized countries, chosen by each of the two groups of participants in the Conference from among its members.

6. In determining the composition of its representation in each commission, each of the two groups at the Conference should choose from among its members those who, because of their special interest and the overall significance of their participation, seem best suited to take part in order that the work may be carried out in an effective and responsible manner.

7. The chairmanship of each of the commissions should be assumed by two co-chairmen designated by each of the two groups respectively. Joint meetings of the co-chairmen of the commissions may be planned if the need arises.

8. The Preparatory Meeting recommends that the intergovernmental functional organizations which are directly concerned with the problems considered, and which the Ministerial Conference deems to be able to make a useful contribution to their discussion, be represented on a permanent basis in the corresponding commissions by observers with the right to speak but without the right to vote, and hence not participating in the formation of a consensus. In addition to the United Nations Secretariat, the list of these organizations should include, in particular, OPEC, IEA, UNCTAD, OECD, FAO, GATT, UNIDO, UNDP, IMF and IBRD.[1] Furthermore, each commission may invite appropriate intergovernmental functional organizations to participate as observers *ad hoc* in the examination of specific questions.

9. Members of the Conference wishing to follow the work of a commission to which they do not belong should be entitled to appoint a representative in the capacity of auditor without the right to speak.

10. The activities of the four commissions whose establishment is recommended by the Preparatory Meeting will proceed on the basis of the relevant paragraphs of the Aide-Memoire annexed to the

[1] Organization of Petroleum Exporting Countries; International Energy Agency; United Nations Conference on Trade and Development; Organization for Economic Cooperation and Development; Food and Agriculture Organization; General Agreement on Tariffs and Trade; United Nations Industrial Development Organization; United Nations Development Program; International Monetary Fund; International Bank for Reconstruction and Development.

French Government's invitation to this Meeting, in the light of the following clarifications and interpretations:

(a) It is understood that the Commission on Energy will facilitate all arrangements which may seem advisable in the field of energy.

(b) It is understood that the Commission on Raw Materials will take into account the progress made in other international forums and will be entrusted with facilitating the establishment or reinforcement, as the case may be, of arrangements which may seem advisable in the field of raw materials—including foodstuffs—which are of particular interest to developing countries.

(c) It is understood that the Commission on Development will take into account the progress in other international forums and the results achieved, and will be entrusted with facilitating the establishment or reinforcement, as the case may be, of arrangements for accelerating the development of developing countries, on the basis of close co-operation.

(d) It is understood that the Commission on Financial Affairs may discuss financial issues, including their monetary aspects, of importance to member countries, while respecting the jurisdiction of international institutions (IMF, IBRD).

(e) It is understood that the four Commissions should function in parallel and that the results of their work are linked and should be submitted to the Ministerial Conference.

11. It is agreed that any delegation may raise any subject relevant to the themes of the dialogue for discussion in the Commissions.

12. It has been agreed in accordance with the relevant paragraphs of the above-mentioned Aide-Memoire that the Ministerial Conference will be called upon to set the general guidelines for the work of the Commissions.

13. The Preparatory Meeting recommends to the Ministerial Conference that the relevant paragraphs of the above-mentioned Aide-Memoire, as interpreted and clarified above, as well as the above-mentioned principle that any relevant subject may be raised for discussion in the Commissions, serve as the general guidelines for the Commissions.

14. Some delegations have already tabled with this Preparatory Meeting documents proposing subjects to be discussed in the Commissions. The Preparatory Meeting recommends that the Ministerial Conference agree that these and any other proposals which may be tabled subsequently in accordance with the general guidelines be discussed in the Commissions.

15. As regards the practical measures, the Preparatory Meeting recommends that the Conference adopt English, Arabic, Spanish and French as official languages and working languages.

16. The Preparatory Meeting recommends that the Conference adopt the Rules of Procedure which it itself had adopted, and which are based, in particular, on the principle of "consensus", according to which decisions and recommendations are adopted when the Chair has established that no member delegation has made any objection.

17. The Preparatory Meeting considers that the Conference should have an international secretariat with an exclusively administrative and technical function, the Ministerial meeting being responsible, on the basis of proposals by the two co-chairmen, for determining its organization, establishing its operational procedure and allocating the financial costs in respect of it. It is understood, however, that pending a decision on the provisions to be adopted for the continuation of the work, the French Government will assume responsibility and provide the secretariat for the Ministerial meeting scheduled for December 1975, under the conditions in which these services were provided for the Preparatory Meeting.

18. The Preparatory Meeting finally recommends that the Ministerial Conference decide to meet again at ministerial level in about twelve months' time. One or several meetings of the Conference at the level of government officials could possibly be held at least six months after the first meeting of the Conference at ministerial level.

19. In conclusion, the participants paid tribute to President Giscard d'Estaing for the initiative taken by him, thanks to which a dialogue was successfully initiated, and to the French Government for all the efforts it has made towards that end.

Topics To Be Discussed in the Dialogue

U.S. and Developing Countries' lists of proposed subjects for discussion in the four Commissions that will be created by the Conference on International Economic Cooperation when it meets December 16, 1975, in Paris.

LISTS OF SUBJECTS TO BE DISCUSSED BY THE COMMISSIONS, AS PROPOSED BY THE UNITED STATES OF AMERICA

Commission on Energy:

(1) Oil prices, their relationship to long term demand and supply for energy and to world economic progress;
(2) Security of supply and markets for oil and oil products;
(3) Cooperation among developed and developing countries to promote increased energy supplies.

Commission on Raw Materials:

(1) Access to supply and markets for raw materials;
(2) Problems of stability of export earnings;
(3) Growth and diversification of export trade;
(4) Enhancement of long run supply of raw materials through application of capital, management, and technology with mutual respect for contractual obligations;
(5) Enhancement of functioning and stability of markets for commodities, including food, on a case-by-case basis.

Commission on Development:

(1) Problems caused by payments deficits of developing countries particularly the most seriously affected;
(2) Financial assistance, arrangements conducive to the transfer of technology, international investment and capital market access to accelerate growth in developing countries;
(3) Promotion of agricultural and food production through, inter alia, enlargement of world food production capacity, particularly in developing countries, and food aid;
(4) Promotion of development through enhanced trade opportunities among developed and developing countries;
(5) Policies for promoting rapid industrial growth.

Commission on Financial Affairs:

Financial issues related to work of other commissions, for example:

On Energy

—Financial consequences of energy prices;
—Conditions for international investment; including placement of surplus oil funds.

On Raw Materials

—Financial implications of commodity arrangements;
—Export earnings stabilization.

On Development

—Financing of investment projects in the developing countries;
—Financing of food imports of developing countries and increased agricultural production;
—Approaches to payments deficits of developing countries.

DOCUMENT SUBMITTED BY ALGERIA, SAUDI ARABIA, BRASIL, INDIA, IRAN, VENEZUELA AND ZAIRE, IN CONNECTION WITH THE SUBJECTS TO BE DISCUSSED BY THE COMMISSIONS

The delegations of the countries mentioned above recommend that the general guidelines be inspired by the provisions of the Resolution 3362 of the Seventh Special Session of the United Nations General Assembly on "Development and International Economic Cooperation", and also take into account, inter alia, the following:

1.— The Commission on Energy should consider: development and conditions of supply and demand of energy, hydro-carbons and other resources, including the protection of the purchasing power of energy export earnings.

2.— The Commission on Raw Materials should consider: development and supply conditions of raw materials in respect of development needs of developing countries, including the revalorization and protection of the purchasing power of developing countries export earnings.

3.— The Commission on Development should consider: trade (access to markets for products of developing countries, etc.); accelerated industrialization; transfer of technology; development of agriculture; development of infrastructure; problems of supply of food and fertilizers (special attention to devising measures for ensuring adequate supplies of food and fertilizers at reasonable prices to developing countries); special and urgent attention to the question of the grave difficulties of MSAC's [most seriously affected countries] created by the current economic situation; and the need to increase present assistance to meet their pressing requirements.

4.— The Commission on Financial Affairs should consider: relevant aspects of international monetary problems; financial co-operation and investment; and financial flows and investments in industrialized countries, including the problems of long-term investments, the protection of the real value of financial assets, and problems of the international financial markets.

U.S. Closing Statement at Second Preparatory Meeting

Statement by Charles W. Robinson, Under Secretary for Economic Affairs, made at the close of the Second Preparatory Meeting in Paris, October 16, 1975.

We returned to Paris this week to resume the dialogue with solid hopes founded in the consensus proposal circulated by the Government of France. I am very pleased to say that our hopes were fulfilled.

The consensus which brought us back to Paris was the work of six months of intensive contacts and frank exchanges among our governments following our April meeting. These six months brought major changes —in the world itself, in our perceptions, and in our official views. My government, for example, further developed its policies in this area, with the resulting initiatives that were elaborated in Secretary Kissinger's speech to the U.N. seventh special session.

There is now throughout the world a heightened sensitivity to the problems of the poorest countries. We also see a deeper recognition of the interdependence of all the nations of the world. As Secretary Kissinger said at the U.N. special session: ". . . neither the poor nor the rich nations can achieve their purposes in isolation." The improvement of life in each of our countries is linked to progress in all of our countries and in the world economy. In a world where so many more interests join than divide us, we have also come to realize that shared responsibilities underlie international relations.

At no time during this conference have I doubted that we would succeed. Given the needs and problems that brought us here, we had an obligation to succeed—to persevere and confirm the understandings that will carry us into the next stage of this dialogue.

With hard bargaining, but in an atmosphere of good will, compromise, and mutual understanding, we now have taken the step which enables us to launch the dialogue between our countries. Our purpose is to strengthen international economic cooperation in the critical areas of energy, development, raw materials—including foodstuffs —and related financial matters.

I wish to congratulate and thank all my colleagues from the various delegations for their constructive contributions both during and prior to this meeting. I would also like to join with my colleagues in acknowledging the special credit due the Government of France. It was instrumental in achieving the consensus upon which this dialogue was based. As our gracious hosts last April and this week—and as our hosts-to-be in December—our French friends have helped greatly to bring us together as human beings as well as official representatives of our countries. I would like particularly to thank the chairman of the conference, M. de Guiringaud [Louis de Guiringaud, Permanent Representative of France to the United Nations], for his tireless efforts in making this meeting a success.

Particularly difficult and challenging international economic problems have emerged in the last two years. Our aim is to meet these problems and to convert them—as much as we can—into opportunities, seeking practical results through cooperative action. We see this as a joint venture among developed and developing countries.

We have no illusions about the difficulties ahead in building a new global consensus. However, one thing is clear: through the efforts and good will of all participants, we can look forward to a true dialogue, in which the participants—with increasing convergence in their perceptions of the problems— will hear each other out on all subjects of interest which fit within the agreed framework.

The preparatory meeting this week has achieved its purpose by clarifying and reconfirming the consensus. My government is determined now to move ahead. We look for-

ward to the December Conference of Ministers to launch the dialogue on which our hopes are based. Beyond the conference, we look to the prompt engagement of the four commissions in the substantive issues of the dialogue. We have taken an important step at this meeting in establishing the dialogue which can and must contribute significantly to human progress and to the well-being of all of our peoples.

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APPENDIX II

Agreement on an International Energy Program

AGREEMENT
ON AN
INTERNATIONAL ENERGY PROGRAM

ACCORD
RELATIF A
UN PROGRAMME INTERNATIONAL
DE L'ÉNERGIE

ÜBEREINKOMMEN
ÜBER EIN
INTERNATIONALES ENERGIEPROGRAMM

AGREEMENT
ON AN
INTERNATIONAL ENERGY PROGRAM

THE GOVERNMENTS OF THE REPUBLIC OF AUSTRIA, THE KINGDOM OF BELGIUM, CANADA, THE KINGDOM OF DENMARK, THE FEDERAL REPUBLIC OF GERMANY, IRELAND, THE ITALIAN REPUBLIC, JAPAN, THE GRAND DUCHY OF LUXEMBOURG, THE KINGDOM OF THE NETHERLANDS, SPAIN, THE KINGDOM OF SWEDEN, THE SWISS CONFEDERATION, THE REPUBLIC OF TURKEY, THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND, AND THE UNITED STATES OF AMERICA,

DESIRING to promote secure oil supplies on reasonable and equitable terms,

DETERMINED to take common effective measures to meet oil supply emergencies by developing an emergency self-sufficiency in oil supplies, restraining demand and allocating available oil among their countries on an equitable basis,

DESIRING to promote co-operative relations with oil producing countries and with other oil consuming countries, including those of the developing world, through a purposeful dialogue, as well as through other forms of co-operation, to further the opportunities for a better understanding between consumer and producer countries,

MINDFUL of the interests of other oil consuming countries, including those of the developing world,

DESIRING to play a more active role in relation to the oil industry by establishing a comprehensive international information system and a permanent framework for consultation with oil companies,

DETERMINED to reduce their dependence on imported oil by undertaking long-term co-operative efforts on conservation of energy, on accelerated development of alternative sources of energy, on research and development in the energy field and on uranium enrichment,

CONVINCED that these objectives can only be reached through continued co-operative efforts within effective organs,

EXPRESSING the intention that such organs be created within the framework of the Organisation for Economic Co-operation and Development,

RECOGNISING that other Member countries of the Organisation for Economic Co-operation and Development may desire to join in their efforts,

CONSIDERING the special responsibility of governments for energy supply,

CONCLUDE that it is necessary to establish an International Energy Program to be implemented through an International Energy Agency, and to that end,

HAVE AGREED as follows:

Article 1

1. The Participating Countries shall implement the International Energy Program as provided for in this Agreement through the International Energy Agency, described in Chapter IX, hereinafter referred to as the "Agency".

2. The term "Participating Countries" means States to which this Agreement applies provisionally and States for which the Agreement has entered into and remains in force.

3. The term "group" means the Participating Countries as a group.

Chapter I

EMERGENCY SELF-SUFFICIENCY

Article 2

1. The Participating Countries shall establish a common emergency self-sufficiency in oil supplies. To this end, each Participating Country shall maintain emergency reserves sufficient to sustain consumption for at least 60 days with no net oil imports. Both consumption and net oil imports shall be reckoned at the average daily level of the previous calendar year.

2. The Governing Board shall, acting by special majority, not later than 1st July, 1975, decide the date from which the emergency reserve commitment of each Participating Country shall, for the purpose of calculating its supply right referred to in Article 7, be deemed to be raised to a level of 90 days. Each Participating Country shall increase its actual level of emergency reserves to 90 days and shall endeavour to do so by the date so decided.

3. The term "emergency reserve commitment" means the emergency reserves equivalent to 60 days of net oil imports as set out in paragraph 1 and, from the date to be decided according to paragraph 2, to 90 days of net oil imports as set out in paragraph 2.

Article 3

1. The emergency reserve commitment set out in Article 2 may be satisfied by:

— oil stocks,

— fuel switching capacity,

— stand-by oil production,

in accordance with the provisions of the Annex which forms an integral part of this Agreement.

2. The Governing Board shall, acting by majority, not later than 1st July, 1975, decide the extent to which the emergency reserve commitment may be satisfied by the elements mentioned in paragraph 1.

Article 4

1. The Standing Group on Emergency Questions shall, on a continuing basis, review the effectiveness of the measures taken by each Participating Country to meet its emergency reserve commitment.

2. The Standing Group on Emergency Questions shall report to the Management Committee, which shall make proposals, as appropriate, to the Governing Board. The Governing Board may, acting by majority, adopt recommendations to Participating Countries.

Chapter II

DEMAND RESTRAINT

Article 5

1. Each Participating Country shall at all times have ready a program of contingent oil demand restraint measures enabling it to reduce its rate of final consumption in accordance with Chapter IV.

2. The Standing Group on Emergency Questions shall, on a continuing basis, review and assess:

— each Participating Country's program of demand restraint measures,

— the effectiveness of measures actually taken by each Participating Country.

3. The Standing Group on Emergency Questions shall report to the Management Committee, which shall make proposals, as appropriate, to the Governing Board. The Governing Board may, acting by majority, adopt recommendations to Participating Countries.

Chapter III

ALLOCATION

Article 6

1. Each Participating Country shall take the necessary measures in order that allocation of oil will be carried out pursuant to this Chapter and Chapter IV.

2. The Standing Group on Emergency Questions shall, on a continuing basis, review and assess:

— each Participating Country's measures in order that allocation of oil will be carried out pursuant to this Chapter and Chapter IV.

— the effectiveness of measures actually taken by each Participating Country.

3. The Standing Group on Emergency Questions shall report to the Management Committee, which shall make proposals, as appropriate, to the Governing Board. The Governing Board may, acting by majority, adopt recommendations to Participating Countries.

4. The Governing Board shall, acting by majority, decide promptly on the practical procedures for the allocation of oil and on the procedures and modalities for the participation of oil companies therein within the framework of this Agreement.

Article 7

1. When allocation of oil is carried out pursuant to Article 13, 14, or 15, each Participating Country shall have a supply right equal to its permissible consumption less its emergency reserve drawdown obligation.

2. A Participating Country whose supply right exceeds the sum of its normal domestic production and actual net imports available during an emergency shall have an allocation right which entitles it to additional net imports equal to that excess.

3. A Participating Country in which the sum of normal domestic production and actual net imports available during an emergency exceeds its supply right shall have an allocation obligation which requires it to supply, directly or indirectly, the quantity of oil equal to that excess to other Participating Countries. This would not preclude any Participating Country from maintaining exports of oil to non-participating countries.

4. The term "permissible consumption" means the average daily rate of final consumption allowed when emergency demand restraint at the applicable level has been activated; possible further voluntary demand restraint by any Participating Country shall not affect its allocation right or obligation.

5. The term "emergency reserve drawdown obligation" means the emergency reserve commitment of any Participating Country divided by the total emergency reserve commitment of the group and multiplied by the group supply shortfall.

6. The term "group supply shortfall" means the shortfall for the group as measured by the aggregate permissible consumption for the group minus the daily rate of oil supplies available to the group during an emergency.

7. The term "oil supplies available to the group" means

— all crude oil available to the group,

— all petroleum products imported from outside the group, and

— all finished products and refinery feedstocks which are produced in association with natural gas and crude oil and are available to the group.

8. The term "final consumption" means total domestic consumption of all finished petroleum products.

Article 8

1. When allocation of oil to a Participating Country is carried out pursuant to Article 17, that Participating Country shall

— sustain from its final consumption the reduction in its oil supplies up to a level equal to 7 per cent of its final consumption during the base period,

— have an allocation right equal to the reduction in its oil supplies which results in a reduction of its final consumption over and above that level.

2. The obligation to allocate this amount of oil is shared among the other Participating Countries on the basis of their final consumption during the base period.

3. The Participating Countries may meet their allocation obligations by any measures of their own choosing, including demand restraint measures or use of emergency reserves.

Article 9

1. For purposes of satisfying allocation rights and allocation obligations, the following elements will be included:

— all crude oil,

— all petroleum products,

— all refinery feedstocks, and

— all finished products produced in association with natural gas and crude oil.

2. To calculate a Participating Country's allocation right, petroleum products normally imported by that Participating Country, whether from other Participating Countries or from non-participating countries, shall be expressed in crude oil equivalent and treated as though they were imports of crude oil to that Participating Country.

3. Insofar as possible, normal channels of supply will be maintained as well as the normal supply proportions between crude oil and products and among different categories of crude oil and products.

4. When allocation takes place, an objective of the Program shall be that available crude oil and products shall, insofar as possible, be shared within the refining and distributing industries as well as between refining and distributing companies in accordance with historical supply patterns.

Article 10

1. The objectives of the Program shall include ensuring fair treatment for all Participating Countries and basing the price for allocated oil on the price conditions prevailing for comparable commercial transactions.

2. Questions relating to the price of oil allocated during an emergency shall be examined by the Standing Group on Emergency Questions.

Article 11

1. It is not an objective of the Program to seek to increase, in an emergency, the share of world oil supply that the group had under normal market conditions. Historical oil trade patterns should be preserved as far as is reasonable, and due account should be taken of the position of individual non-participating countries.

2. In order to maintain the principles set out in paragraph 1, the Management Committee shall make proposals, as appropriate, to the Governing Board, which, acting by majority, shall decide on such proposals.

Chapter IV

ACTIVATION

ACTIVATION

Article 12

Whenever the group as a whole or any Participating Country sustains or can reasonably be expected to sustain a reduction in its oil supplies, the emergency measures, which are the mandatory demand restraint referred to in Chapter II and the allocation of available oil referred to in Chapter III, shall be activated in accordance with this Chapter.

Article 13

Whenever the group sustains or can reasonably be expected to sustain a reduction in the daily rate of its oil supplies at least equal to 7 per cent of the average daily rate of its final consumption during the base period, each Participating Country shall implement demand restraint measures sufficient to reduce its final consumption by an amount equal to 7 per cent of its final consumption during the base period, and allocation of available oil among the Participating Countries shall take place in accordance with Articles 7, 9, 10 and 11.

Article 14

Whenever the group sustains or can reasonably be expected to sustain a reduction in the daily rate of its oil supplies at least equal to 12 per cent of the average daily rate of its final consumption during the base period, each Participating Country shall implement demand restraint measures sufficient to reduce its final consumption by an amount equal to 10 per cent of its final consumption during the base period, and allocation of available oil among the Participating Countries shall take place in accordance with Articles 7, 9, 10 and 11.

Article 15

When cumulative daily emergency reserve drawdown obligations as defined in Article 7 have reached 50 per cent of emergency reserve commitments and a decision

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has been taken in accordance with Article 20, each Participating Country shall take the measures so decided, and allocation of available oil among the Participating Countries shall take place in accordance with Articles 7, 9, 10 and 11.

Article 16

When demand restraint is activated in accordance with this Chapter, a Participating Country may substitute for demand restraint measures use of emergency reserves held in excess of its emergency reserve commitment as provided in the Program.

Article 17

1. Whenever any Participating Country sustains or can reasonably be expected to sustain a reduction in the daily rate of its oil supplies which results in a reduction of the daily rate of its final consumption by an amount exceeding 7 per cent of the average daily rate of its final consumption during the base period, allocation of available oil to that Participating Country shall take place in accordance with Articles 8 to 11.

2. Allocation of available oil shall also take place when the conditions in paragraph 1 are fulfilled in a major region of a Participating Country whose oil market is incompletely integrated. In this case, the allocation obligation of other Participating Countries shall be reduced by the theoretical allocation obligation of any other major region or regions of the Participating Country concerned.

Article 18

1. The term "base period" means the most recent four quarters with a delay of one-quarter necessary to collect information. While emergency measures are applied with regard to the group or to a Participating Country, the base period shall remain fixed.

2. The Standing Group on Emergency Questions shall examine the base period set out in paragraph 1, taking into account in particular such factors as growth, seasonal variations in consumption and cyclical changes and shall, not later than 1st April, 1975, report to the Management Committee. The Management Committee shall make proposals, as appropriate, to the Governing Board, which, acting by majority, shall decide on these proposals not later than 1st July, 1975.

Article 19

1. The Secretariat shall make a finding when a reduction of oil supplies as mentioned in Article 13, 14 or 17 has occurred or can reasonably be expected to occur,

and shall establish the amount of the reduction or expected reduction for each Participating Country and for the group. The Secretariat shall keep the Management Committee informed of its deliberations, and shall immediately report its finding to the members of the Committee and inform the Participating Countries thereof. The report shall include information on the nature of the reduction.

2. Within 48 hours of the Secretariat's reporting a finding, the Committee shall meet to review the accuracy of the data compiled and the information provided. The Committee shall report to the Governing Board within a further 48 hours. The report shall set out the views expressed by the members of the Committee, including any views regarding the handling of the emergency.

3. Within 48 hours of receiving the Management Committee's report, the Governing Board shall meet to review the finding of the Secretariat in the light of that report. The activation of emergency measures shall be considered confirmed and Participating Countries shall implement such measures within 15 days of such confirmation unless the Governing Board, acting by special majority, decides within a further 48 hours not to activate the emergency measures, to activate them only in part or to fix another time limit for their implementation.

4. If, according to the finding of the Secretariat, the conditions of more than one of the Articles 14, 13 and 17 are fulfilled, any decision not to activate emergency measures shall be taken separately for each Article and in the above order. If the conditions in Article 17 are fulfilled with regard to more than one Participating Country any decision not to activate allocation shall be taken separately with respect to each Country.

5. Decisions pursuant to paragraphs 3 and 4 may at any time be reversed by the Governing Board, acting by majority.

6. In making its finding under this Article, the Secretariat shall consult with oil companies to obtain their views regarding the situation and the appropriateness of the measures to be taken.

7. An international advisory board from the oil industry shall be convened, not later than the activation of emergency measures, to assist the Agency in ensuring the effective operation of such measures.

Article 20

1. The Secretariat shall make a finding when cumulative daily emergency reserve drawdown obligations have reached or can reasonably be expected to reach 50 per cent of emergency reserve commitments. The Secretariat shall immediately report its finding to the members of the Management Committee and inform the Participating Countries thereof. The report shall include information on the oil situation.

DEACTIVATION

Article 23

1. The Secretariat shall make a finding when a reduction of supplies as mentioned in Article 13, 14 or 17 has decreased or can reasonably be expected to decrease below the level referred to in the relevant Article. The Secretariat shall keep the Management Committee informed of its deliberations and shall immediately report its finding to the members of the Committee and inform the Participating Countries thereof.

2. Within 72 hours of the Secretariat's reporting a finding, the Management Committee shall meet to review the data compiled and the information provided. It shall report to the Governing Board within a further 48 hours. The report shall set out the views expressed by the members of the Committee, including any views regarding the handling of the emergency.

3. Within 48 hours of receiving the Committee's report, the Governing Board shall meet to review the finding of the Secretariat in the light of the report from the Management Committee. The deactivation of emergency measures or the applicable reduction of the demand restraint level shall be considered confirmed unless the Governing Board, acting by special majority, decides within a further 48 hours to maintain the emergency measures or to deactivate them only in part.

4. In making its finding under this Article, the Secretariat shall consult with the international advisory board, mentioned in Article 19, paragraph 7, to obtain its views regarding the situation and the appropriateness of the measures to be taken.

5. Any Participating Country may request the Secretariat to make a finding under this Article.

Article 24

When emergency measures are in force, and the Secretariat has not made a finding under Article 23, the Governing Board, acting by special majority, may at any time decide to deactivate the measures either wholly or in part.

Chapter V

INFORMATION SYSTEM ON THE INTERNATIONAL OIL MARKET

Article 25

1. The Participating Countries shall establish an Information System consisting of two sections:

— a General Section on the situation in the international oil market and activities of oil companies,

— a Special Section designed to ensure the efficient operation of the measures described in Chapters I to IV.

2. The System shall be operated on a permanent basis, both under normal conditions and during emergencies, and in a manner which ensures the confidentiality of the information made available.

3. The Secretariat shall be responsible for the operation of the Information System and shall make the information compiled available to the Participating Countries.

Article 26

The term "oil companies" means international companies, national companies, non-integrated companies and other entities which play a significant role in the international oil industry.

GENERAL SECTION

Article 27

1. Under the General Section of the Information System, the Participating Countries shall, on a regular basis, make available to the Secretariat information on the

precise data identified in accordance with Article 29 on the following subjects relating to oil companies operating within their respective jurisdictions:

(a) Corporate structure;

(b) Financial structure, including balance sheets, profit and loss accounts, and taxes paid;

(c) Capital investments realised;

(d) Terms of arrangements for access to major sources of crude oil;

(e) Current rates of production and anticipated changes therein;

(f) Allocations of available crude supplies to affiliates and other customers (criteria and realisations);

(g) Stocks;

(h) Cost of crude oil and oil products;

(i) Prices, including transfer prices to affiliates;

(j) Other subjects, as decided by the Governing Board, acting by unanimity.

2. Each Participating Country shall take appropriate measures to ensure that all oil companies operating within its jurisdiction make such information available to it as is necessary to fulfil its obligations under paragraph 1, taking into account such relevant information as is already available to the public or to Governments.

3. Each Participating Country shall provide information on a non-proprietary basis and on a company and/or country basis as appropriate, and in such a manner and degree as will not prejudice competition or conflict with the legal requirements of any Participating Country relating to competition.

4. No Participating Country shall be entitled to obtain, through the General Section, any information on the activities of a company operating within its jurisdiction which could not be obtained by it from that company by application of its laws or through its institutions and customs if that company were operating solely within its jurisdiction.

Article 28

Information provided on a "non-proprietary basis" means information which does not constitute or relate to patents, trademarks, scientific or manufacturing processes or developments, individual sales, tax returns, customer lists or geological and geophysical information, including maps.

Article 29

1. Within 60 days of the first day of the provisional application of this Agreement, and as appropriate thereafter, the Standing Group on the Oil Market shall submit a report to the Management Committee identifying the precise data within the list of subjects in Article 27, paragraph 1, which are required for the efficient operation of the General Section, and specifying the procedures for obtaining such data on a regular basis.

2. The Management Committee shall review the report and make proposals to the Governing Board which, within 30 days of the submission of the report to the Management Committee, and acting by majority, shall take the decisions necessary for the establishment and efficient operation of the General Section.

Article 30

In preparing its reports under Article 29, the Standing Group on the Oil Market shall

— consult with oil companies to ensure that the System is compatible with industry operations;

— identify specific problems and issues which are of concern to Participating Countries;

— identify specific data which are useful and necessary to resolve such problems and issues;

— work out precise standards for the harmonization of the required information in order to ensure comparability of the data;

— work out procedures to ensure the confidentiality of the information.

Article 31

1. The Standing Group on the Oil Market shall on a continuing basis review the operation of the General Section.

2. In the event of changes in the conditions of the international oil market, the Standing Group on the Oil Market shall report to the Management Committee. The Committee shall make proposals on appropriate changes to the Governing Board which, acting by majority, shall decide on such proposals.

Article 32

1. Under the Special Section of the Information System, the Participating Countries shall make available to the Secretariat all information which is necessary to ensure the efficient operation of emergency measures.

2. Each Participating Country shall take appropriate measures to ensure that all oil companies operating within its jurisdiction make such information available to it as is necessary to enable it to fulfil its obligations under paragraph 1 and under Article 33.

3. The Secretariat shall, on the basis of this information and other information available, continuously survey the supply of oil to and the consumption of oil within the group and each Participating Country.

Article 33

Under the Special Section, the Participating Countries shall, on a regular basis, make available to the Secretariat information on the precise data identified in accordance with Article 34 on the following subjects:

(a) Oil consumption and supply;

(b) Demand restraint measures;

(c) Levels of emergency reserves;

(d) Availability and utilisation of transportation facilities;

(e) Current and projected levels of international supply and demand;

(f) Other subjects, as decided by the Governing Board, acting by unanimity.

Article 34

1. Within 30 days of the first day of the provisional application of this Agreement, the Standing Group on Emergency Questions shall submit a report to the Management Committee identifying the precise data within the list of subjects in Article 33 which are required under the Special Section to ensure the efficient operation of emergency measures and specifying the procedures for obtaining such data on a regular basis, including accelerated procedures in times of emergency.

The Management Committee shall review the report and make proposals to the Governing Board which, within 30 days of the submission of the report to the Management Committee, and acting by majority, shall take the decisions necessary for the establishment and efficient operation of the Special Section.

Article 35

In preparing its report under Article 34, the Standing Group on Emergency Questions shall

— consult with oil companies to ensure that the System is compatible with industry operations;

— work out precise standards for the harmonization of the required information in order to ensure comparability of the data;

— work out procedures to ensure the confidentiality of the information.

Article 36

The Standing Group on Emergency Questions shall on a continuing basis review the operation of the Special Section and shall, as appropriate, report to the Management Committee. The Committee shall make proposals on appropriate changes to the Governing Board, which, acting by majority, shall decide on such proposals.

Chapter VI

FRAMEWORK FOR CONSULTATION WITH OIL COMPANIES

Article 37

1. The Participating Countries shall establish within the Agency a permanent framework for consultation within which one or more Participating Countries may, in an appropriate manner, consult with and request information from individual oil companies on all important aspects of the oil industry, and within which the Participating Countries may share among themselves on a co-operative basis the results of such consultations.

2. The framework for consultation shall be established under the auspices of the Standing Group on the Oil Market.

3. Within 60 days of the first day of the provisional application of this Agreement, and as appropriate thereafter, the Standing Group on the Oil Market, after consultation with oil companies, shall submit a report to the Management Committee on the procedures for such consultations. The Management Committee shall review the report and make proposals to the Governing Board, which, within 30 days of the submission of the report to the Management Committee, and acting by majority, shall decide on such procedures.

Article 38

1. The Standing Group on the Oil Market shall present a report to the Management Committee on consultations held with any oil company within 30 days thereof.

2. The Management Committee shall consider the report and may make proposals on appropriate co-operative action to the Governing Board, which shall decide on such proposals.

Article 39

1. The Standing Group on the Oil Market shall, on a continuing basis, evaluate the results of the consultations with and the information collected from oil companies.

2. On the basis of these evaluations, the Standing Group may examine and assess the international oil situation and the position of the oil industry and shall report to the Management Committee.

3. The Management Committee shall review such reports and make proposals on appropriate co-operative action to the Governing Board, which shall decide on such proposals.

Article 40

The Standing Group on the Oil Market shall submit annually a general report to the Management Committee on the functioning of the framework for consultation with oil companies.

Chapter VII

LONG TERM CO-OPERATION ON ENERGY

Article 41

1. The Participating Countries are determined to reduce over the longer term their dependence on imported oil for meeting their total energy requirements.

2. To this end, the Participating Countries will undertake national programs and promote the adoption of co-operative programs, including, as appropriate, the sharing of means and efforts, while concerting national policies, in the areas set out in Article 42.

Article 42

1. The Standing Group on Long Term Co-operation shall examine and report to the Management Committee on co-operative action. The following areas shall in particular be considered:

(a) Conservation of energy, including co-operative programs on

— exchange of national experiences and information on energy conservation;

— ways and means for reducing the growth of energy consumption through conservation.

(b) Development of alternative sources of energy such as domestic oil, coal, natural gas, nuclear energy and hydro-electric power, including co-operative programs on

— exchange of information on such matters as resources, supply and demand, price and taxation;

— ways and means for reducing the growth of consumption of imported oil through the development of alternative sources of energy;

— concrete projects, including jointly financed projects;

— criteria, quality objectives and standards for environmental protection.

(c) Energy research and development, including as a matter of priority co-operative programs on

— coal technology;

— solar energy;

— radioactive waste management;

— controlled thermonuclear fusion;

— production of hydrogen from water;

— nuclear safety;

— waste heat utilisation;

— conservation of energy;

— municipal and industrial waste utilisation for energy conservation;

— overall energy system analysis and general studies.

(d) Uranium enrichment, including co-operative programs

— to monitor developments in natural and enriched uranium supply;

— to facilitate development of natural uranium resources and enrichment services;

— to encourage such consultations as may be required to deal with international issues that may arise in relation to the expansion of enriched uranium supply;

— to arrange for the requisite collection, analysis and dissemination of data related to the planning of enrichment services.

2. In examining the areas of co-operative action, the Standing Group shall take due account of ongoing activities elsewhere.

3. Programs developed under paragraph 1 may be jointly financed. Such joint financing may take place in accordance with Article 64, paragraph 2.

Article 43

1. The Management Committee shall review the reports of the Standing Group and make appropriate proposals to the Governing Board, which shall decide on these proposals not later than 1st July, 1975.

2. The Governing Board shall take into account possibilities for co-operation within a broader framework.

Chapter VIII

RELATIONS WITH PRODUCER COUNTRIES AND WITH OTHER CONSUMER COUNTRIES

Article 44

The Participating Countries will endeavour to promote co-operative relations with oil producing countries and with other oil consuming countries, including developing countries. They will keep under review developments in the energy field with a view to identifying opportunities for and promoting a purposeful dialogue, as well as other forms of co-operation, with producer countries and with other consumer countries.

Article 45

To achieve the objectives set out in Article 44, the Participating Countries will give full consideration to the needs and interests of other oil consuming countries, particularly those of the developing countries.

Article 46

The Participating Countries will, in the context of the Program, exchange views on their relations with oil producing countries. To this end, the Participating Countries should inform each other of co-operative action on their part with producer countries which is relevant to the objectives of the Program.

Article 47

The Participating Countries will, in the context of the Program

— seek, in the light of their continuous review of developments in the international energy situation and its effect on the world economy, opportunities and means of encouraging stable international trade in oil and of promoting secure oil supplies on reasonable and equitable terms for each Participating Country;

— consider, in the light of work going on in other international organisations, other possible fields of co-operation including the prospects for co-operation in accelerated industrialisation and socio-economic development in the principal producing areas and the implications of this for international trade and investment;

— keep under review the prospects for co-operation with oil producing countries on energy questions of mutual interest, such as conservation of energy, the development of alternative sources, and research and development.

Article 48

1. The Standing Group on Relations with Producer and other Consumer Countries will examine and report to the Management Committee on the matters described in this Chapter.

2. The Management Committee may make proposals on appropriate co-operative action regarding these matters to the Governing Board, which shall decide on such proposals.

Chapter IX

INSTITUTIONAL AND GENERAL PROVISIONS

Article 49

1. The Agency shall have the following organs:

— a Governing Board

— a Management Committee

— Standing Groups on

— — Emergency Questions

— — The Oil Market

— — Long Term Co-operation

— — Relations with Producer and Other Consumer Countries.

2. The Governing Board or the Management Committee may, acting by majority, establish any other organ necessary for the implementation of the Program.

3. The Agency shall have a Secretariat to assist the organs mentioned in paragraphs 1 and 2.

GOVERNING BOARD

Article 50

1. The Governing Board shall be composed of one or more ministers or their delegates from each Participating Country.

2. The Governing Board, acting by majority, shall adopt its own rules of procedure. Unless otherwise decided in the rules of procedure, these rules shall also apply to the Management Committee and the Standing Groups.

3. The Governing Board, acting by majority, shall elect its Chairman and Vice-Chairmen.

Article 51

1. The Governing Board shall adopt decisions and make recommendations which are necessary for the proper functioning of the Program.

2. The Governing Board shall review periodically and take appropriate action concerning developments in the international energy situation, including problems relating to the oil supplies of any Participating Country or Countries, and the economic and monetary implications of these developments. In its activities concerning the economic and monetary implications of developments in the international energy situation, the Governing Board shall take into account the competence and activities of international institutions responsible for overall economic and monetary questions.

3. The Governing Board, acting by majority, may delegate any of its functions to any other organ of the Agency.

Article 52

1. Subject to Article 61, paragraph 2, and Article 65, decisions adopted pursuant to this Agreement by the Governing Board or by any other organ by delegation from the Board shall be binding on the Participating Countries.

2. Recommendations shall not be binding.

MANAGEMENT COMMITTEE

Article 53

1. The Management Committee shall be composed of one or more senior representatives of the Government of each Participating Country.

2. The Management Committee shall carry out the functions assigned to it in this Agreement and any other function delegated to it by the Governing Board.

3. The Management Committee may examine and make proposals to the Governing Board, as appropriate, on any matter within the scope of this Agreement.

4. The Management Committee shall be convened upon the request of any Participating Country.

5. The Management Committee, acting by majority, shall elect its Chairman and Vice-Chairmen.

STANDING GROUPS

Article 54

1. Each Standing Group shall be composed of one or more representatives of the Government of each Participating Country.

2. The Management Committee, acting by majority, shall elect the Chairmen and Vice-Chairmen of the Standing Groups.

Article 55

1. The Standing Group on Emergency Questions shall carry out the functions assigned to it in Chapters I to V and the Annex and any other function delegated to it by the Governing Board.

2. The Standing Group may review and report to the Management Committee on any matter within the scope of Chapters I to V and the Annex.

3. The Standing Group may consult with oil companies on any matter within its competence.

Article 56

1. The Standing Group on the Oil Market shall carry out the functions assigned to it in Chapters V and VI and any other function delegated to it by the Governing Board.

2. The Standing Group may review and report to the Management Committee on any matter within the scope of Chapters V and VI.

3. The Standing Group may consult with oil companies on any matter within its competence.

Article 57

1. The Standing Group on Long Term Co-operation shall carry out the functions assigned to it in Chapter VII and any other function delegated to it by the Governing Board.

2. The Standing Group may review and report to the Management Committee on any matter within the scope of Chapter VII.

Article 58

1. The Standing Group on Relations with Producer and other Consumer Countries shall carry out the functions assigned to it in Chapter VIII and any other function delegated to it by the Governing Board.

2. The Standing Group may review and report to the Management Committee on any matter within the scope of Chapter VIII.

3. The Standing Group may consult with oil companies on any matter within its competence.

SECRETARIAT

Article 59

1. The Secretariat shall be composed of an Executive Director and such staff as is necessary.

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2. The Executive Director shall be appointed by the Governing Board.

3. In the performance of their duties under this Agreement the Executive Director and the staff shall be responsible to and report to the organs of the Agency.

4. The Governing Board, acting by majority, shall take all decisions necessary for the establishment and the functioning of the Secretariat.

Article 60

The Secretariat shall carry out the functions assigned to it in this Agreement and any other function assigned to it by the Governing Board.

VOTING

Article 61

1. The Governing Board shall adopt decisions and recommendations for which no express voting provision is made in this Agreement, as follows:

(a) by majority:

— decisions on the management of the Program, including decisions applying provisions of this Agreement which already impose specific obligations on Participating Countries

— decisions on procedural questions

— recommendations

(b) by unanimity:

— all other decisions, including in particular decisions which impose on Participating Countries new obligations not already specified in this Agreement.

2. Decisions mentioned in paragraph 1 *(b)* may provide:

(a) that they shall not be binding on one or more Participating Countries;

(b) that they shall be binding only under certain conditions.

Article 62

1. Unanimity shall require all of the votes of the Participating Countries present and voting. Countries abstaining shall be considered as not voting.

2. When majority or special majority is required, the Participating Countries shall have the following voting weights:

	General voting weights	Oil consumption voting weights	Combined voting weights
Austria	3	1	4
Belgium	3	2	5
Canada	3	5	8
Denmark	3	1	4
Germany	3	8	11
Ireland	3	0	3
Italy	3	6	9
Japan	3	15	18
Luxembourg	3	0	3
The Netherlands	3	2	5
Spain	3	2	5
Sweden	3	2	5
Switzerland	3	1	4
Turkey	3	1	4
United Kingdom	3	6	9
United States	3	48	51
Totals	48	100	148

3. Majority shall require 60 per cent of the total combined voting weights and 50 per cent of the general voting weights cast.

4. Special majority shall require:

(a) 60 per cent of the total combined voting weights and 36 general voting weights for:

— the decision under Article 2, paragraph 2, relating to the increase in the emergency reserve commitment;

— decisions under Article 19, paragraph 3, not to activate the emergency measures referred to in Articles 13 and 14;

— decisions under Article 20, paragraph 3, on the measures required for meeting the necessities of the situation;

— decisions under Article 23, paragraph 3, to maintain the emergency measures referred to in Articles 13 and 14;

— decisions under Article 24 to deactivate the emergency measures referred to in Articles 13 and 14.

(b) 42 general voting weights for:

— decisions under Article 19, paragraph 3, not to activate the emergency measures referred to in Article 17;

— decisions under Article 23, paragraph 3, to maintain the emergency measures referred to in Article 17;

— decisions under Article 24 to deactivate the emergency measures referred to in Article 17.

5. The Governing Board, acting by unanimity, shall decide on the necessary increase, decrease, and redistribution of the voting weights referred to in paragraph 2, as well as on amendment of the voting requirements set out in paragraphs 3 and 4 in the event that

— a Country accedes to this Agreement in accordance with Article 71, or

— a Country withdraws from this Agreement in accordance with Article 68, paragraph 2, or Article 69, paragraph 2.

6. The Governing Board shall review annually the number and distribution of voting weights specified in paragraph 2, and, on the basis of such review, acting by unanimity, shall decide whether such voting weights should be increased or decreased, or redistributed, or both, because a change in any Participating Country's share in total oil consumption has occurred or for any other reason.

7. Any change in paragraph 2, 3 or 4 shall be based on the concepts underlying those paragraphs and paragraph 6.

RELATIONS WITH OTHER ENTITIES

Article 63

In order to achieve the objectives of the Program, the Agency may establish appropriate relations with non-participating countries, international organisations, whether governmental or non-governmental, other entities and individuals.

FINANCIAL ARRANGEMENTS

Article 64

1. The expenses of the Secretariat and all other common expenses shall be shared among all Participating Countries according to a scale of contributions elaborated according to the principles and rules set out in the Annex to the "OECD Resolution of the Council on Determination of the Scale of Contributions by Member Countries to the Budget of the Organisation" of 10th December, 1963. After the first year of application of this Agreement, the Governing Board shall review this scale of contributions and, acting by unanimity, shall decide upon any appropriate changes in accordance with Article 73.

2. Special expenses incurred in connection with special activities carried out pursuant to Article 65 shall be shared by the Participating Countries taking part in such special activities in such proportions as shall be determined by unanimous agreement between them.

3. The Executive Director shall, in accordance with the financial regulations adopted by the Governing Board and not later than 1st October of each year, submit to the Governing Board a draft budget including personnel requirements. The Governing Board, acting by majority, shall adopt the budget.

4. The Governing Board, acting by majority, shall take all other necessary decisions regarding the financial administration of the Agency.

5. The financial year shall begin on 1st January and end on 31st December of each year. At the end of each financial year, revenues and expenditures shall be submitted to audit.

SPECIAL ACTIVITIES

Article 65

1. Any two or more Participating Countries may decide to carry out within the scope of this Agreement special activities, other than activities which are required to be carried out by all Participating Countries under Chapters I to V. Participating Countries which do not wish to take part in such special activities shall abstain from taking part in such decisions and shall not be bound by them. Participating Countries carrying out such activities shall keep the Governing Board informed thereof.

2. For the implementation of such special activities, the Participating Countries concerned may agree upon voting procedures other than those provided for in Articles 61 and 62.

IMPLEMENTATION OF THE AGREEMENT

Article 66

Each Participating Country shall take the necessary measures, including any necessary legislative measures, to implement this Agreement and decisions taken by the Governing Board.

Chapter X

FINAL PROVISIONS

Article 67

1. Each Signatory State shall, not later than 1st May, 1975, notify the Government of Belgium that, having complied with its constitutional procedures, it consents to be bound by this Agreement.

2. On the tenth day following the day on which at least six States holding at least 60 per cent of the combined voting weights mentioned in Article 62 have deposited a notification of consent to be bound or an instrument of accession, this Agreement shall enter into force for such States.

3. For each Signatory State which deposits its notification thereafter, this Agreement shall enter into force on the tenth day following the day of deposit.

4. The Governing Board, acting by majority, may upon request from any Signatory State decide to extend, with respect to that State, the time limit for notification beyond 1st May, 1975.

Article 68

1. Notwithstanding the provisions of Article 67, this Agreement shall be applied provisionally by all Signatory States, to the extent possible not inconsistent with their legislation, as from 18th November, 1974 following the first meeting of the Governing Board.

2. Provisional application of the Agreement shall continue until:

— the Agreement enters into force for the State concerned in accordance with Article 67, or

— 60 days after the Government of Belgium receives notification that the State concerned will not consent to be bound by the Agreement, or

— the time limit for notification of consent by the State concerned referred to in Article 67 expires.

Article 69

1. This Agreement shall remain in force for a period of ten years from the date of its entry into force and shall continue in force thereafter unless and until the Governing Board, acting by majority, decides on its termination.

2. Any Participating Country may terminate the application of this Agreement for its part upon twelve months' written notice to the Government of Belgium to that effect, given not less than three years after the first day of the provisional application of this Agreement.

Article 70

1. Any State may, at the time of signature, notification of consent to be bound in accordance with Article 67, accession or at any later date, declare by notification addressed to the Government of Belgium that this Agreement shall apply to all or any of the territories for whose international relations it is responsible, or to any territories within its frontiers for whose oil supplies it is legally responsible.

2. Any declaration made pursuant to paragraph 1 may, in respect of any territory mentioned in such declaration, be withdrawn in accordance with the provisions of Article 69, paragraph 2.

Article 71

1. This Agreement shall be open for accession by any Member of the Organisation for Economic Co-operation and Development which is able and willing to meet the requirements of the Program. The Governing Board, acting by majority, shall decide on any request for accession.

2. This Agreement shall enter into force for any State whose request for accession has been granted on the tenth day following the deposit of its instrument of accession with the Government of Belgium, or on the date of entry into force of the Agreement pursuant to Article 67, paragraph 2, whichever is the later.

3. Until 1st May, 1975, accession may take place on a provisional basis under the conditions set out in Article 68.

Article 72

1. This Agreement shall be open for accession by the European Communities.

2. This Agreement shall not in any way impede the further implementation of the treaties establishing the European Communities.

Article 73

This Agreement may at any time be amended by the Governing Board, acting by unanimity. Such amendment shall come into force in a manner determined by the Governing Board, acting by unanimity and making provision for Participating Countries to comply with their respective constitutional procedures.

Article 74

This Agreement shall be subject to a general review after 1st May, 1980.

Article 75

The Government of Belgium shall notify all Participating Countries of the deposit of each notification of consent to be bound in accordance with Article 67, and of each instrument of accession, of the entry into force of this Agreement or any amendment thereto, of any denunciation thereof, and of any other declaration or notification received.

Article 76

The original of this Agreement, of which the English, French and German texts are equally authentic, shall be deposited with the Government of Belgium, and a certified copy thereof shall be furnished to each other Participating Country by the Government of Belgium.

IN WITNESS WHEREOF the undersigned, being duly authorised thereto by their respective Governments, have signed this Agreement.

DONE at Paris, this eighteenth day of November, Nineteen Hundred and Seventy Four.

EN FOI DE QUOI, les soussignés, dûment autorisés à cet effet par leurs Gouvernements respectifs, ont signé le présent Accord.

FAIT à Paris, le dix-huit novembre mil neuf cent soixante-quatorze.

ZU URKUND DESSEN haben die hierzu von ihren Regierungen gehörig befugten Unterzeichneten dieses Übereinkommen unterschrieben.

GESCHEHEN zu Paris am 18. November 1974.

For the REPUBLIC OF AUSTRIA :

Pour la RÉPUBLIQUE D'AUTRICHE :

Für die REPUBLIK ÖSTERREICH :

For the KINGDOM OF BELGIUM :

Pour le ROYAUME DE BELGIQUE :

Für das KÖNIGREICH BELGIEN :

For CANADA :

Pour le CANADA :

Für KANADA :

For the KINGDOM OF DENMARK :

Pour le ROYAUME DE DANEMARK :

Für das KÖNIGREICH DÄNEMARK :

For the FEDERAL REPUBLIC OF GERMANY :

Pour la RÉPUBLIQUE FÉDÉRALE D'ALLEMAGNE :

Für die BUNDESREPUBLIK DEUTSCHLAND :

For IRELAND :

Pour l'IRLANDE :

Für IRLAND :

For the ITALIAN REPUBLIC :

Pour la RÉPUBLIQUE ITALIENNE :

Für die ITALIENISCHE REPUBLIK:

For JAPAN :

Pour le JAPON :

Für JAPAN :

For the GRAND DUCHY OF LUXEMBOURG :

Pour le GRAND DUCHÉ DE LUXEMBOURG :

Für das GROSSHERZOGTUM LUXEMBURG:

For the KINGDOM OF THE NETHERLANDS :

Pour le ROYAUME DES PAYS-BAS :

Für das KÖNIGREICH DER NIEDERLANDE :

For Spain :

Pour l'Espagne :

Für Spanien :

For the Kingdom of Sweden :

Pour le Royaume de Suède :

Für das Königreich Schweden :

For the Swiss Confederation :

Pour la Confédération Suisse :

Für die Schweizerische Eidgenossenschaft:

For the Republic of Turkey:

Pour la République de Turquie :

Für die Republik Türkei :

For the United Kingdom of Great Britain and Northern Ireland :

Pour le Royaume-Uni de Grande-Bretagne et d'Irlande du Nord :

Für das Vereinigte Königreich von Grossbritannien und Nordirland :

For the United States of America :

Pour les Etats-Unis d'Amérique :

Für die Vereinigten Staaten von Amerika:

ANNEX

EMERGENCY RESERVES

Article 1

1. Total oil stocks are measured according to the OECD and EEC definitions, revised as follows:

A. Stocks included:

crude oil, major products and unfinished oils held

— in refinery tanks
— in bulk terminals
— in pipeline tankage
— in barges
— in intercoastal tankers
— in oil tankers in port
— in inland ship bunkers
— in storage tank bottoms
— in working stocks
— by large consumers as required by law or otherwise controlled by Governments.

B. Stocks excluded:

(a) crude oil not yet produced

(b) crude oil, major products and unfinished oils held

— in pipelines
— in rail tank cars
— in truck tank cars
— in seagoing ships' bunkers
— in service stations and retail stores
— by other consumers
— in tankers at sea
— as military stocks.

2. That portion of oil stocks which can be credited toward each Participating Country's emergency reserve commitment is its total oil stocks under the above definition minus those stocks which can be technically determined as being absolutely unavailable in even the most severe emergency. The Standing Group on Emergency Questions shall examine this concept and report on criteria for the measurement of absolutely unavailable stocks.

3. Until a decision has been taken on this matter, each Participating Country shall subtract 10 per cent from its total stocks in measuring its emergency reserves.

4. The Standing Group on Emergency Questions shall examine and report to the Management Committee on:

(a) the modalities of including naphtha for uses other than motor and aviation gasoline in the consumption against which stocks are measured,

(b) the possibility of creating common rules for the treatment of marine bunkers in an emergency, and of including marine bunkers in the consumption against which stocks are measured,

(c) the possibility of creating common rules concerning demand restraint for aviation bunkers,

(d) the possibility of crediting towards emergency reserve commitments some portion of oil at sea at the time of activation of emergency measures,

(e) the possibility of increasing supplies available in an emergency through savings in the distribution system.

Article 2

1. Fuel switching capacity is defined as normal oil consumption that may be replaced by other fuels in an emergency, provided that this capacity is subject to government control in an emergency, can be brought into operation within one month, and that secure supplies of the alternative fuel are available for use.

2. The supply of alternative fuel shall be expressed in terms of oil equivalent.

3. Stocks of an alternative fuel reserved for fuel switching purposes may be credited towards emergency reserve commitments insofar as they can be used during the period of self-sufficiency.

4. Stand-by production of an alternative fuel reserved for fuel switching purposes will be credited towards emergency reserve commitments on the same basis as stand-by oil production, subject to the provisions of Article 4 of this Annex.

5. The Standing Group on Emergency Questions shall examine and report to the Management Committee on

(a) the appropriateness of the time limit of one month mentioned in paragraph 1,

(b) the basis of accounting for the fuel switching capacity based on stocks of an alternative fuel, subject to the provisions of paragraph 3.

Article 3

A Participating Country may credit towards its emergency reserve commitment oil stocks in another country provided that the Government of that other country has an agreement with the Government of the Participating Country that it shall impose no impediment to the transfer of those stocks in an emergency to the Participating Country.

Article 4

1. Stand-by oil production is defined as a Participating Country's potential oil production in excess of normal oil production within its jurisdiction

— which is subject to government control, and

— which can be brought into use during an emergency within the period of self-sufficiency.

2. The Standing Group on Emergency Questions shall examine and report to the Management Committee on

(a) the concept of and methods of measurement of stand-by oil production as referred to in paragraph 1,

(b) the appropriateness of "the period of self-sufficiency" as a time limit,

(c) the question of whether a given quantity of stand-by oil production is of greater value for purposes of emergency self-sufficiency than the same quantity of oil stocks, the amount of a possible credit for stand-by production, and the method of its calculation.

Article 5

Stand-by oil production available to a Participating Country within the jurisdiction of another country may be credited towards its emergency reserve commitment

on the same basis as stand-by oil production within its own jurisdiction, subject to the provisions of Article 4 of this Annex provided that the Government of that other country has an agreement with the Government of the Participating Country that it shall impose no impediment to the supply of oil from that stand-by capacity to the Participating Country in an emergency.

Article 6

The Standing Group on Emergency Questions shall examine and report to the Management Committee on the possibility of crediting towards a Participating Country's emergency reserve commitment mentioned in Article 2, paragraph 2, of the Agreement, long term investments which have the effect of reducing the Participating Countries' dependence on imported oil.

Article 7

1. The Standing Group on Emergency Questions shall examine and report to the Management Committee regarding the reference period set out in Article 2, paragraph 1, of the Agreement, in particular taking into account such factors as growth, seasonal variations in consumption and cyclical changes.

2. A decision by the Governing Board to change the definition of the reference period mentioned in paragraph 1 shall be taken by unanimity.

Article 8

The Standing Group on Emergency Questions shall examine and report to the Management Committee on all elements of Chapters I to IV of the Agreement to eliminate possible mathematical and statistical anomalies.

Article 9

The reports from the Standing Group on Emergency Questions on the matters mentioned in this Annex shall be submitted to the Management Committee by 1st April, 1975. The Management Committee shall make proposals, as appropriate, to the Governing Board, which, acting by majority, not later than 1st July, 1975, shall decide on these proposals, except as provided for in Article 7, paragraph 2, of this Annex.

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